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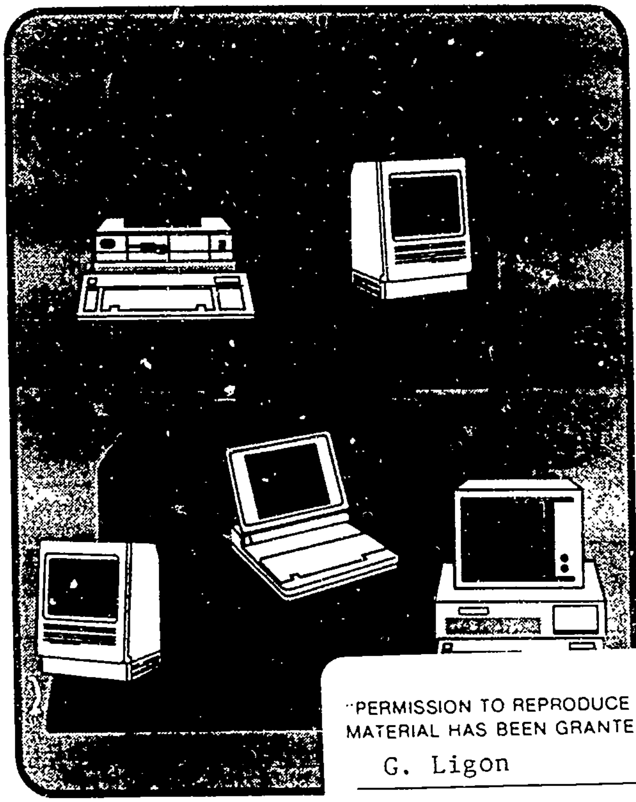
ABSTRACT

The 1992-93 school year was the third year of the Elementary Technology Demonstration Schools program of the Austin (Texas) schools; the project is funded by International Business Machines Corporation (IBM) and Apple Computer Inc. Grants from these corporations were used to equip three elementary schools with IBM equipment and one with Apple equipment. The IBM schools pursued a mixed instructional approach with computers in the classroom as well as computer laboratories. The Apple program used computer laboratories, one dedicated to writing and two for basic skills acquisition. The program is nearing full implementation. Problems inhibiting full participation include difficulties with the class reporting option, inconsistent implementation of the computer take-home policy, difficulties in teacher use of telephone technology, and the lack of parent and community involvement. Recommendations are made to improve program implementation and availability for students. The percentage of students passing the Texas Assessment of Academic Skills in writing did increase in the IBM schools. Thirty-one figures present study findings. Eight attachments, with an additional 10 tables and 4 figures, provide supplemental information about the program. (Contains four references.) (SLD)

Elementary Technology Demonstration Schools



The Third Year 1992-93

Austin Independent School District
Office of Research and Evaluation

GLOSSARY

Byte - A unit of information consisting of eight grouped bits (binary digits). Each byte is typically used to represent a letter, number, special character, or computer instructions, according to a standard code. A kilobyte (KB) is 1,000 bytes. A megabyte (MB) is 1,000,000 bytes.

CD-ROM - Compact Disk, Read-only Memory. Read-only memory is accessible to the computer but incapable of being changed. ROM usually contains instructions and decoding information.

Disk - An information-storage device. A disk is a random access medium, which means that information can be retrieved from any port of it without having to "read" through it from the beginning, as is required with magnetic tape.

Hard Drive - A device used for storage of information on a permanent or semi-permanent basis. A hard drive is a large rigid platter capable of storing base amounts of data.

LAN, Local Area Network - Computers that are hooked together in series to form a network.

Laser Disk - Disk which allow for the storage and retrieval of pictures and sound.

Modem, Modulator-Demodulator - Hardware which allows two computers to interact over telephone lines using electronic signals.

Networked server - In a series of networked computers, the network server holds the main operating files for the network and is the main depository for systemwide files (e.g., the AISD network servers collect and store the student log files).

Scanner - Device that will allow a person to convert hardcopy text or images into text or images that can be stored in a computer-readable format.

Software - The programs that control the operation of a computer.

Technology - Technology in this report refers to any computer hardware, computer software, telephones, liquid crystal display (LCD), modems, and other peripherals.

Token Ring - Adapter for a LAN

Elementary Technology Demonstration Schools, The Third Year, 1992-93

Executive Summary

Austin Independent School District
Office of Research and Evaluation

Author: Melissa Sabatino

Program Description

The 1992-93 school year was the third year of the Elementary Technology Demonstration Schools (ETDS) program. The program was made possible by two grants from IBM, having a retail value of $6.8 million, and a grant worth a retail value of $74,000 from Apple, Inc. These grant monies were used to equip three elementary schools (Andrews, Langford, and Patton) with IBM equipment and one elementary school (Galindo) with Apple equipment.

The schools involved in the project did not use uniform instructional methods. The IBM schools pursued a mixed approach that included placing computers in the classroom, in addition to computer laboratories. The project design called for the classroom computers to be integrated into instruction through a centers-based approach. The Apple school pursued a strategy of placing computers in laboratories. The Apple school had three computer labs, one dedicated to writing activities, and two labs for basic skills acquisition.

The primary purpose of the ETDS program is to restructure the classroom learning environment using technology as the catalyst for change. To demonstrate the effectiveness of technology in accelerating the learning of low-achieving students and enhancing the education of high-achieving students, the program has four specific objectives:

1. In three years, reduce by 50% the number of students who are not in their age-appropriate grade level;
2. In three years, reduce by 50% the number of students who are not achieving on grade level in reading, writing, and mathematics;
3. Develop a comprehensive teacher training program to ensure effective implementation and classroom use of technology; and
4. Demonstrate to the community the educational benefits of technology, thereby obtaining support for districtwide implementation.

Major Findings

1. The program is nearing full implementation. Several problems that inhibit full implementation include:
   - The class reporting option, which is not consistently operating as required to provide reliable feedback to teachers about student computer usage;
   - Many teachers not using the telephones as recommended;
   - The inconsistent implementation of the computer take-home program; and
   - The lack of parent and community involvement in school activities. (Pages 7-12)
2. During the three years of the program, the percentage of overage student has decreased at the ETDS. However, the percentage of overage students at the four campuses exceeded the District average by two percentage points, 12% compared to 10%. (Page 33)
3. Effectiveness analyses results are mixed on the effect of the impact of technology on student achievement. (Page 16)
4. The number of students failing a section of TAAS has decreased at the ETDS. Two schools (Langford and Patton) reached the 50% reduction goal in one subject area. (Page 34)
5. The percentage of students passing the grade 3 TAAS writing section increased an average of 13.3 percentage points at the three IBM schools, compared to a six percentage point District increase. (Page 21)
6. Minority and economically disadvantaged students at the ETDS are performing as well as or better in relation to other District minority and economically disadvantaged students. (Page 23)
7. Information System Architecture principles for software selection are not being followed at one school. (Page 8)

Budget Implications

Mandate:
Required by the School Board.

FundingAmount:
$233,994 (annual operating cost)

Funding Source:
Local and external (private)

Implications:
The District is bound by an agreement with the two major fund providers of this project (IBM and Apple) to continue supporting the project. As the District examines ways to use State and local money for technology. the insights gained from the technology strategies employed in this project will be vital.

Recommendations

1. A districtwide evaluation of the availability and use of technology should be conducted. The four ETDS could be evaluated in this context.
2. The class reporting option or another measure should be used to provide reliable feedback to teachers concerning degree of student computer usage.
3. Additional telephone training for teachers is needed to demonstrate how to record, change, and retrieve messages.
4. Additional efforts should be made by school and A+ Coalition staffs to include parents and the community in the school activities.
5. The AISD Information System Architecture principles must be followed when selecting additional software, so that AISD will not have a collection of random, unsupported, noneducational software.

PROGRAM EFFECTIVENESS SUMMARY
Elementary Technology Demonstration Schools

PROGRAM	Rating	Allocation (COST)	Number of Students Served	Cost Per Student	Effect (in months)	Cost per Student for 1 month gain (COST/EFFECT)
Andrews Funding Source: External Grades: Pre-K - 5 Level of Service: All day/all year	0	$63,253 $1,580,956 Investment cost for hardware, software, and wiring.	843	$75	R: .5 M: .75 Avg: .63	$119
Galindo Funding Source: External Grades: Pre-K - 5 Level of Service: All day/all year	0	$44,235 $246,000 Investment cost for hardware, software, and wiring.	751	$59	R: .5 M: 1.25 Avg: .88	$67
Langford Funding Source: External Grades: Pre-K - 5 Level of Service: All day/all year	0	$63,253 $1,229,642 Investment cost for hardware, software, and wiring.	574	$94	R: -1.0 M: -1.5 Avg: -1.25	-
Patton Funding Source: External Grades: Pre-K - 5 Level of Service: All day/all year	0	$63,253 $1,834,320 Investment cost for hardware, software, and wiring.	1,307	$61	R: .25 M: 1.25 Avg: .75	$81

The investment cost is the cost of getting the program "up and going"; it is distinguished from the annual cost of maintaining and operating the program once it is in place.

The investment cost for hardware, software, and wiring is calculated using the 40% educational discount that is afforded to all educational institutions.

Rating is expressed as contributing to any of the five AISD strategic objectives

+	Positive, needs to be kept and expanded
0	Not significant, needs to be improved and modified
-	Negative, needs major modification or replacement

Cost is the expense over the regular District per-student expenditure of $4,000.

0	*No cost* or minimal cost
$	*Indirect costs* and overhead, but no separate budget
$$	*Some direct costs*, but under $500 per student
$$$	*Major direct costs* for teachers, staff, and/or equipment in the range of $500 per student or more.

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CONCLUSIONS AND RECOMMENDATIONS

The 1992-93 school year was the third year of the ETDS program and the second full year of classroom technology implementation. After three years of program implementation, 9 out of 10 ETDS teachers thought that the technology benefitted their students, and 8 in every 10 would recommend that technology be implemented districtwide. Overall, the ETDS are beginning to show positive growth in student achievement and teacher attitude; however, additional effort will be required to implement the program fully.

Portions of the program at the IBM schools are nearing full implementation. Several problems that inhibit full implementation include: the class reporting option, which is not consistently operating as required to provide reliable feedback to teachers concerning degree of student computer usage; many teachers not using the telephones as recommended, because of differing principal expectations; the inconsistent implementation of the computer take-home program; the incorrect procurement of new software by one school; and the lack of parent and community involvement in school activities.

Results are mixed on the effect of the impact of technology on student achievement. Report on School Effectiveness (ROSE) results demonstrate that Galindo exceeded the predicted gain on three scores (30%) and equalled the predicted gain on seven scores (70%), while the IBM schools exceeded the predicted gain on three scores (10%), were below the predicted gain on six scores (20%), and equalled the predicted gain on 21 scores (70%). However, results were more positive on the Texas Assessment of Academic Skills (TAAS). The three IBM schools reduced the number of grade 3 students failing a section of TAAS and increased the number of students passing the writing section. Two schools reached the 50% reduction goal in one subject area. Langford reduced the number of students failing mathematics from 28% to 12%, and Patton decreased the number of students failing writing from 20% to 8% during the three years of program implementation.

On the grade 3 TAAS, African American and economically disadvantaged students at Andrews and Langford, and Hispanic students at Andrews, Galindo, Langford, and Patton, were performing at higher levels on TAAS than other African American, Hispanic, and economically disadvantaged students districtwide. Grade 4 TAAS scores show that African American students at Andrews are performing equally with African American students across the District. Hispanic students at Patton are performing well above other Hispanic students districtwide. Economically disadvantaged students at Andrews, Langford, and Patton are performing better than other economically disadvantaged students across the District.

In addition to the A+ ETDS, most schools in AISD are using computers for instructional purposes. There are a variety of settings, modes, and levels of use at elementary, middle/junior high, and high school levels. No effort has been made at the District level, to determine how technology is used and how it affects student performance.

Based on the information contained in this report, ORE recommends:

1. A districtwide evaluation of the availability and use of technology should be conducted. The four ETDS could be evaluated in this context.

2. The class reporting option or another measure should be used to provide reliable feedback to teachers concerning degree of student computer usage.

3. Additional telephone training for teachers is needed to demonstrate how to record, change, and retrieve messages.

4. Additional efforts should be made by administrators, teachers, and A+ Coalition staff to include parents and community stakeholders in the school decision-making process.

5. The Information System Architecture principles must be followed when selecting additional software, so that AISD will not have a collection of random, unsupported, noneducational software.

INTRODUCTION

The Elementary Technology Demonstration Schools (ETDS) program of Project A+ (now the A+ Coalition) began in the Austin Independent School District (AISD) in the 1990-91 school year. This is the third evaluation report for the program. See *Project A+ Elementary Technology Demonstration Schools, 1990-91: The First Year* (ORE Publication No. 90.32) and *Project A+ Elementary Technology Demonstration Schools, 1991-92: The Second Year* (ORE Publication No. 91.30) for evaluations of the first two years of the program.

The A+ Coalition, an AISD/IBM initiative established in the spring of 1989, is designed to improve the District's educational environment by acting as a catalyst for change and marshalling community resources. IBM became involved in the A+ Coalition, which is part of its nationwide efforts to improve education, through its participation in the Washington-based Business Roundtable. The Roundtable, an association in which the 200 largest corporations examine public policy issues, has decided to focus on education.

The primary purpose of the ETDS program is to restructure the classroom learning environment using technology as the catalyst for change. To demonstrate the effectiveness of technology in accelerating the learning of low-achieving students and enhancing the education of high-achieving students, the program plan contained four specific goals:

1. In three years, reduce by 50% the number of students who are not in their age-appropriate grade level;

2. In three years, reduce by 50% the number of students who are not achieving on grade level in reading, writing, and mathematics;

3. Develop a comprehensive teacher training program to ensure effective implementation and classroom use of technology; and,

4. Demonstrate to the community the educational benefits of technology, thereby obtaining support for districtwide implementation.

In 1990-91, Andrews, Langford, and Patton received computer equipment and software from IBM with a retail value of $4.4 million. The three campuses also received an additional upgrade (retail value of $2.4 million) of wiring for a 16 megabyte token ring and additional hardware and software in 1992-93. These grants are the largest the company has ever made to a school district. Galindo also received computer equipment and software with a retail value of $74,000 from Apple, Inc.

The original program plan stated that the ETDS program would continue for three years. However, when a technical upgrade was conducted at the beginning of the 1992-93 school year, the program was extended. The extension will allow for the installation of Writing to Write™ forms III and IV and KidsWare™ at the IBM schools during the 1993-94 school year. The program plan also mandated that an Instructional Technology Coordinator be appointed to assist the ETDS. The coordinator developed and organized training, and provided technical, curricular, and managerial support to the schools.

Schools involved in the program do not use uniform instructional methods. The IBM schools pursued a mixed approach that included placing computers in the classroom, in addition to computer laboratories. The program design called for the classroom computers to be integrated into instruction through a centers-based approach, where groups of four or five students rotate through several learning stations. One of these stations is the computer station. Galindo pursues a strategy of placing computers in laboratories. Galindo had three computer labs, one dedicated to writing activities, and the other two Minnesota Educational Computer Corporation (MECC) Management Master labs utilized for basic skills acquisition.

Information for this report was obtained from computer log data, Iowa Tests of Basic Skills (ITBS)/Norm-referenced Assessment Program for Texas (NAPT) and TAAS student achievement data, staff interviews, observations by ORE staff, and the 1993 ORE Coordinated Survey.

The report is divided into three sections. The first section evaluates the implementation of the program based on the Level of Implementation Instrument developed by the A+ Coalition Technology School Steering Committee. The second section will examine student achievement, and the final section will measure the progress toward the four specific ETDS program goals.

PROGRAM IMPLEMENTATION COMPONENTS

This section of the report examines the level of program implementation reached as of the 1992-93 school year, using the Level of Implementation Instrument. This instrument provides a framework for implementing technology into AISD schools. The instrument provides feedback to planners, decision makers, and teachers, which is helpful in planning strategies for achieving or maintaining full implementation of restructuring using technology. The instrument focuses upon components that must be affected by restructuring for increased learning to occur. These components not only are indicators of success but are also essential goals of the program. The instrument is concerned with the overall effects of restructuring, and not any site-specific or hardware-dependent aspects of restructuring. This instrument is an attempt to get at the deeper processes occurring during technology implementation and maintenance of the restructuring effort rather than surface characteristics.

The instrument was developed by the A+ Coalition Technology School Steering Committee, which consisted of 10 teachers from the ETDS, the Instructional Technology Coordinator, an A+ Coalition representative, and two ORE staff. The instrument components were developed through brainstorming activities, and by a sorting and organizing procedure done by a smaller group. Descriptive paragraphs have been written about the theoretical beginning and ideal states of implementation (see Figure 1).

FIGURE 1
THEORETICAL MODEL FOR STATES OF TECHNOLOGY IMPLEMENTATION

Component	Beginning State	Ideal State
Teachers as Learners and Facilitators	Teachers are lecturers and controllers of information. The implementation of technology into the classroom requires the teacher to change roles from lecturer to facilitator, with the students as the learning motivators.	The teacher is comfortable with saying "I do not know," and having the students find the answer to teach everyone else in the class. Computers become an integral part of teaching, and most teachers find it difficult to imagine teaching without computers. Teachers also work in a collaborative format to design teaching strategies for all students.
Students as Independent, Motivated, and Self-Regulated Learners	Students are highly motivated, but are entirely teacher-dependent.	Students become software users and software- dependent. Continued progress leads students to explore software independently. As they continue to develop their independence, students integrate the science of technology into their learning system, extend their knowledge into new and varied areas, and are accountable for their own work and outcomes.
Tools	Computers are used minimally, as the hardware is not accessible to all.	A wide range of instructional technological tools is accessible. The technology is reliable and transparent to the end user, and is available 24 hours a day. Also, several packages of age- appropriate software are available.
Instructional Environment	The instructional environment is teacher- controlled and skill-driven. Instruction remains textbook-driven, and whole group instruction is predominant. The teacher frequently lectures, asks questions, and elicits answers from one student at a time. The classroom is generally quiet and very orderly with little movement, as interaction between students is discouraged.	The instructional environment shifts from being textbook-driven to being student- and technology- driven, and revolves around thematic units and integrated subject areas. A higher level of noise is expected as cooperative learning occurs. Student groupings are fluid and often nongraded. Students' natural curiosity is buoyed as they use available resources to work on individual goals and needs. All participants are learners and instructors.
Physical and Logical Structure of the Classroom	The classroom is arranged with rows of desks, and there are no learning centers.	The classroom has been restructured with learning centers. The classroom should stimulate interest, and a wide variety of resources is available so that 100% of the students will be reached regardless of level or learning style.

FIGURE 1 (cont.)

Component	Beginning State	Ideal State
Necessary Support Systems	Training on how to implement technology is minimal, and teachers rely on the computer lab instead of restructuring classrooms. Teachers receive most of their measurement and evaluation information from outside sources, and this evaluation information is often regarded as a judgement and not as useful feedback.	Teachers receive formal training just prior to the installation of new hardware or software, and again as needed during the school year. This training includes implementation of time-saving tips, new software applications, and other subjects deemed necessary by teachers. Informal training also occurs as other teachers and students introduce new software programs or time-saving tips. Also, teachers will evaluate in an ongoing manner the effectiveness of their hardware, software, and instructional strategies as well as receive useful evaluation information from other sources. This information will be used to make positive changes to the ETDS program.
Parents, Community, and Other Stakeholders	Parents are minimally involved in the school. Parents participate mainly through discipline activities. There is a small PTA executive committee, and the same small group of parents is involved in most school activities. Community members have minimal contact with school personnel, mainly through complaints about noise, parking, suspected vandalism, etc. Other stakeholders such as adopters and mentors have minimal interaction with the school. Adopters mainly contribute money and supplies and do not have much personal contact with teachers or students. There are only a few mentors throughout the District.	A large number of parents is involved in all aspects of the school. All classes have adequate parent volunteers, and parents with special areas of expertise are utilized campuswide. Teachers contact parents for positive as well as negative information sharing. There is an active and fully functioning PTA that emphasizes parent training. Community members have active representation on the Campus Leadership Team and are contributing time, resources, and talents to the schools. They believe that whether or not they have students in the school, the school is open to them. For example, neighborhood association meetings are held at the school, or night classes are offered that would be of interest to adults as well as children in the community. Other stakeholders such as adopters interact more with the students on a personal basis (e.g., they act as a substitute teacher for a teacher to attend in-service training or tutor students on a regular basis).

PROGRESS TOWARDS THE "IDEAL" STATES OF IMPLEMENTATION

The following section will evaluate the progress that the campuses have made towards attaining the theoretical implementation ideals mentioned above. The data used to evaluate progress towards the ideal states were gathered through teacher surveys and interviews, classroom observations, and computer log data. An attempt to attain observation data at the four ETDS and three non-ETDS using seven University of Texas graduate students was inconclusive. No concrete conclusions may be drawn from these observations because of their short duration and the nonrandom selection of the teachers observed. The teachers observed were not randomly selected by the researchers, but were assigned by the Instructional Technology Coordinator.

Teachers as Learners and Facilitators

One study has shown that it takes "on average five to seven years for a teacher to become a comfortable, confident user of educational technology." By the fifth year, use of drill and practice

and tutorial software decreases, and teachers begin to expand the number and types of classroom technologies (Telecommunications and Teachers, 1993).

Observations by ORE staff showed that some teachers at the ETDS seem to be learners and facilitators. Many teachers create programs to extend and enrich lesson plans beyond textbooks, use students to solve hardware and software problems, and experiment if they do not know the answer. However, a few teachers remain lecturers and controllers of information.

The observations also showed that many teachers at the ETDS utilized the cooperative learning method to encourage student learning. They gave information about the task and then guided the students if they drifted off-task. The teacher did not lead the students step by step through the lessons; guidance was provided by the computer, partners, worksheets, or the students' own initiative. The teacher spent time tutoring students individually.

Many teachers were comfortable in the role of the facilitator, and thought that classroom technology has made their teaching more effective. Three in four teachers, 73%, agreed or strongly agreed on the 1993 ORE Coordinated Survey that technology in the classroom made their teaching more effective, up from 61% and 69% in previous years' surveys. A few teachers, 5%, believed that the technology has not made their teaching more effective. See Attachment 1A for survey results.

Students as Independent, Motivated, and Self-Regulated Learners

According to teachers, most students are in the middle of technology implementation. Students enjoy working together to solve problems, explore software, and to develop answers to questions that the teachers cannot answer; however, they are not yet aware of their own learning styles which allows them to adjust assignments to meet their own needs.

Teachers believe that today's students at the ETDS are more independent and self-regulated learners than previous students. Observations by ORE staff show that students work in groups and are aware of what they are expected to accomplish. They accomplish tasks via computer, with peers, or on their own. When a problem arises they ask their classmates, utilize reference material, or as a last resort, ask the teacher.

Tools

The hardware and software at Galindo have been fully installed for three years. The IBM schools are nearing the ideal state of hardware and software implementation; however, the limitations discussed below inhibit full implementation.

Class Reporting Option

The IBM-networked equipment features a class reporting option (logging system) to track computer usage by students. Galindo, the Apple school, has class reporting capability, but it is not included in this analysis because data could not be converted and uploaded onto the District local area network (LAN) for analysis. To use the class reporting option, teachers create student menus for their classrooms by selecting software and inserting it in the menu under the appropriate subject, such as

mathematics or reading. The teacher then decides whether or not to log the software. When starting a computer session, students log on by entering their AISD identification number. The class reporting option then automatically records the time in, the time out, the name of software used, and the accuracy of the student on a given task.

The laboratory technicians downloaded the class reporting option data every two weeks, and the evaluation associate analyzed the log data for administrators and teachers. The evaluation associate provided feedback to teachers and administrators each six weeks. The feedback included information on teacher time on computers by subject, total time on computers per student per six weeks, software analysis, and nonschool hours analysis. See Attachment 2 for sample information provided to teachers and administrators.

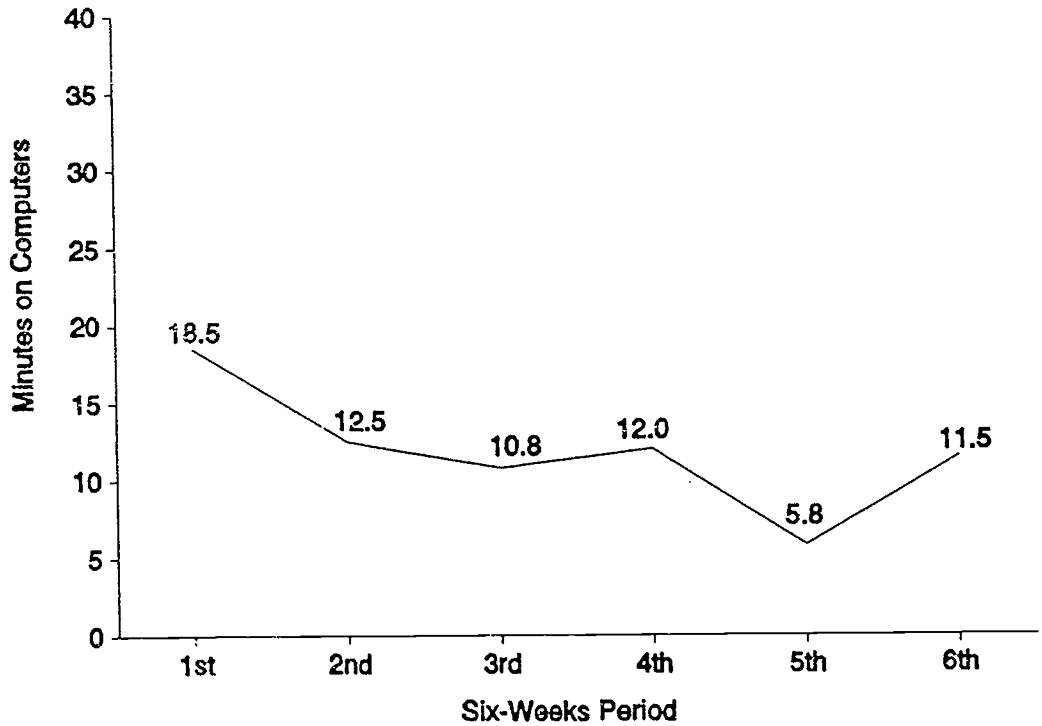
The class reporting system (logging system) encountered several problems during the year. The majority of the problems could be classified as technical problems which included rewiring downtime, system upgrades which erased logs, and loss of log data because of download failures and damaged computer disks.

The class reporting option has several other limitations. The reporting system can log only one student identification number for paired students, giving only one student at a time "credit." Students can log on under only one teacher's name (i.e., for teachers who team teach, only one teacher receives the computer time). Schools are purchasing additional software and using stand-alone computers which are not networked or logged. Attachment 3A is a list of the 39 approved software programs capable of being logged, while Attachment 3B is a list of the 34 programs which the IBM schools have added and are attempting to log. Attachment 3C is a list of software available at Galindo.

Teachers at one school said additional software was being attained from different computer networks and computer stores by the laboratory technician and the school principal. During interviews, teachers said they were uncomfortable with the new software because a new program was added every one or two weeks, they were unsure of how to use the software, and they were uncertain of the software's educational benefit. The AISD Information System Architecture details principles for software selection, and these principles were not being followed at this school. If the principles are not followed AISD will have a selection of random, unsupported, noneducational software.

These limitations added uncertainty to the information provided by the class reporting system. Many of the campus teachers and administrators expressed strong disagreement with the times the logs showed. The class reporting option showed that average minutes per day on computers ranged from 18.5 minutes to 5.8 minutes. See Figure 2 for the average minutes per day on computers at all IBM schools. Because of the uncertainty associated with the logs, the absolute times on task shown in Figure 2 and Attachment 4A-C should be interpreted with caution.

FIGURE 2
AVERAGE STUDENT MINUTES PER DAY ON COMPUTERS
AT ALL IBM SCHOOLS, 1992-93



Grade	1st six weeks*	2nd six weeks	3rd six weeks**	4th six weeks	5th six weeks**	6th six weeks
K	8.0	4.5	5.6	11.7	5.6	11.8
1	27.9	23.2	16.0	18.6	8.9	15.5
2	12.7	13.6	24.1	12.4	3.3	12.3
3	18.2	11.5	9.0	9.4	5.4	10.7
4	27.2	11.0	13.7	9.4	5.1	10.2
5	16.9	10.3	10.8	11.0	6.0	8.8
All	18.5	12.5	10.8	12.0	5.8	11.5

* Logging systems were operational for four to 18 days.
** Teachers were removed from the analysis because of incomplete downloads, damaged disks, and downed servers.

Several attempts were made to obtain an accurate accounting of computer usage. In one attempt, several high-end-use teachers were selected by the Instructional Technology Coordinator, and these teachers were observed for one day to determine use patterns. Figure 3 shows how these high-use teachers utilized computers during one day. Because of the brief observation period and the nonrandom selection of teachers, the numbers shown in Figure 3 should be treated with caution. These numbers suggest that students of high-end-use teachers averaged between 23 to 39 minutes per day on the computer.

FIGURE 3
OBSERVED MINUTES PER DAY ON COMPUTERS AT TWO IBM SCHOOLS, 1992-93

Number of Students	Minutes on Computer
School A	
10 students	14 minutes
11 students	17 minutes
All students	15 minutes
All students	45 minutes (Lab, once a week).
School B	
All students	45 minutes (Lab, once a week)
8 students	28 minutes
5 students	10 minutes
4 students	75 minutes
2 students	15 minutes

Take-Home Computers

The three IBM schools began implementing a parent take-home computer program during the 1991-92 school year. The program allowed selected students to take home computers loaded with specific instructional software designed to accelerate the students' learning. Each campus implements this program differently.

Evaluation of the effectiveness of the take-home computers is difficult because the schools control usage of these computers. According to the principals, however, the program has not been implemented as it was designed. Schools use the computers to train new students when they enter the school, and one school had 25 families participate in a take-home computer program. However, another school has returned many of the computers designated for take-home use to the classroom.

Telephones

The original program plan proposed to place telephones in every classroom to facilitate parent-teacher communications. The telephone system was operational in all ETDS at the beginning of the 1992-93 school year. Patton encountered telephone problems beginning in December when lightning struck a circuit board that controlled telephone activity. The circuit replacement was a costly and time-consuming task, which was not completed by AISD staff until late May. Telephones in Patton's

portable buildings were not operational during spring 1993. However, teacher mailboxes were still active for teachers to record and retrieve messages.

ORE conducted several surveys throughout the school year to determine how teachers were using the telephones. Over 50% of teachers at Galindo and Langford used the telephones as intended, leaving daily or weekly homework assignments and classroom activities on their voice mail message. Parents could call into the voice mail message, listen to the assignments or activities, and leave a message for the teacher. Only 18% of the teachers at Patton and very few teachers at Andrews recorded personal messages containing homework assignments and classroom activities.

On the 1993 ORE Coordinated Survey, teachers were asked if a classroom telephone helped them better communicate with parents. *The vast majority of teachers, 87%, agreed or strongly agreed that the telephone helped them to communicate better with parents.* Because of the technical problems mentioned above, 9% of the responding teachers did not have working phones (see Attachment 1B).

Instructional Environment

Observations and interviews revealed that, although the majority of teachers are implementing classroom technology, some teachers are still resisting change. Several teachers said that the best use of computers was for practice problems, repetition, and the building of social skills. Attempting to increase computer usage, these teachers believed, caused students to miss out on science and social studies units created by the teacher. The teachers also said the lab time was the most effective utilization of the computers, because in class there was not enough time to take advantage of all the software available, and when the class was divided into three groups, the groups not at the computer needed attention or else they lost interest.

The ETDS program was designed to integrate the computers into the curriculum. Responses such as the ones above indicate that more work is needed to integrate technology into the learning environment fully. Not all teachers thought the same as the previously mentioned teachers, however, and many portions of the classroom instructional environment were changing with technology implementation. Most teachers, 79%, thought that technology facilitated curriculum integration into the learning environment (see Attachment 1B).

Observations by ORE staff showed that teachers were also using collaborative groups, and students learned from each other as well as from the teacher. The majority of teachers said that the most effective group occurs when students have differing abilities. Teachers believed the implementation of technology also helped students in many other ways. *The majority of teachers, 81%, believed that the addition of technology into the learning environment allowed them more time to provide individualized instruction to students.* Also, two out of three teachers thought that the technology currently facilitates effective evaluation of students. See Attachment 1B for survey results.

Physical and Logical Structure of the Classroom

This report examines the role of technology and computers in relation to student learning. The computers are important to the success of the program, but they must properly be viewed as only one

part of an overall effort to enhance student learning. Another integral part of the overall program effect is restructuring the classroom and the school to maximize technology in accelerating learning.

ORE staff observations showed that the classroom structure in the ETDS is changing. Many classrooms were open settings, with student desks grouped together. The main focus of the classroom was not the blackboard or the teacher's desk, but the students. The learning centers were apparent and in use. In many classrooms, there were signs and figures for the usage of basic computer functions, such as how to log on and use the function keys. There were also bulletin boards for announcing the weekly theme of Writing to Write™ and displaying writing samples.

Necessary Support Systems

Not all portions of necessary support systems have reached the ideal level of implementation. Teacher training is the most implemented portion of necessary support systems. Initial training was provided to teachers during 1990-91, with follow-up training provided as necessary. New ETDS teachers were trained prior to the new school year and once a month throughout the year. Informal training was also provided by campus experts. Teachers also reported that they often learned time-saving tips or new computer programs from students. Since November 1992, Andrews has also received weekly instruction from an Education Instruction Specialist to help teachers integrate technology into the classroom.

On the 1993 ORE Coordinated Survey, *most teachers, 72%, said they received sufficient training to incorporate technology appropriately into the classroom learning environment*. This percentage was higher than the 66% and the 61% who believed they had received sufficient training in 1992 and 1991, respectively. Only one in ten teachers said that he or she had not received sufficient training, a decrease from one in five teachers in 1991. See Attachment 1A for specific findings.

Several teachers said they believed more grade-specific training was needed (i.e., grade 1 teachers need more specific training with grade 1 software). The District Instructional Technology Coordinator is available to organize specialized training activities.

Parents, Community, and Other Stakeholders

Principals reported increased parental interest in their children's scholastic activities, increased parental visitation to the schools, and increased community interest since the program's initiation. However, the ideal implementation state has not been reached as several parents said that they were disappointed with how slow the schools were to change to include parents and the community in school activities.

STUDENT ACHIEVEMENT

This section details changes in student achievement through the three years of program implementation using ITBS/NAPT, ROPE/ROSE, TAAS, and summer school data.

ITBS/NAPT

During the 1992-93 school year, elementary schools administered the Iowa Tests of Basic Skills (ITBS) and the Norm-referenced Assessment Program for Texas (NAPT), both norm-referenced tests (NRTs). The ITBS was given to grades 1-2, and the NAPT was given to grades 3-5. An NRT is designed to measure student achievement in broadly defined skill areas that cover a wide range of achievement. Scores from NRTs (e.g., percentiles and grade equivalents) compare a student's performance with a nationwide sample of students at the same grade. National norms provided by the test publisher are used. Attachment 5 displays 1991-92 and 1992-93 ITBS and NAPT test scores by ethnic group at the four campuses (1992 norms).

At Andrews, grade 1, 2, and 5 students scored slightly lower than students in the previous year. Grade 3 and 4 students scored higher in 1992-93. At Galindo, grade 1, 2, and 4 students performed better than in previous years. Grade 3 students' scores decreased in reading and language while increasing one percentile point in mathematics. Grade 5 students' scores consistently decreased across all subjects and ethnic groups. At Langford, grade 1, 2, and 4 students' scores increased, while grade 3 and 5 students' scores decreased. Grade 1, 3, 4 and 5 students at Patton attained increased scores, while grade 2 students demonstrated slightly decreased scores. *Overall, at all four campuses, Hispanic students consistently scored higher on the ITBS/NAPT in 1992-93 than in previous years.* See Attachment 5.

ROPE/ROSE

The ETDS differ on many factors, and to compare achievement scores directly could be misleading. The Report on Program Effectiveness (ROPE) and the Report on School Effectiveness (ROSE) provide a more accurate interschool comparison of achievement results. ROPE/ROSE give information on how each school's students perform on standardized tests (NAPT/ITBS) from one year to the next in relation to similar students across the District. The reports combine the individual scores of each student in a school program. ROPE/ROSE adjust the scores for factors out of the school's control (i.e., sex, previous achievement, ethnicity, income level, and age in grade) before making the comparison.

ROPE/ROSE compare students' actual scores with a predicted score for each student. The difference, called a residual, is an indication of how far above or below prediction a student performed on a test compared to students with similar characteristics. The residuals of all students in a program are combined to create a program's ROPE score. The residuals of all students at a school are combined to create a school's ROSE score.

Three ROSE results are possible: exceeded predicted gain, achieved predicted gain, and below predicted gain. A score of achieved predicted gain indicates that an additional program (classroom technology) had no effect on student achievement above and beyond everyday classroom teaching. If the results exceed predicted gain, one can conclude that the program had a significant impact on student achievement. If the results are continually below predicted gain, the program may need to be reexamined. A score exceeding or below predicted gain is based on a statistical test to determine if the residual is significantly different from zero.

This section presents the ROPE/ROSE scores for the four campuses. ROPE/ROSE generate scores only on students who took standardized tests the previous year; therefore, kindergarten and grade 1 students are not included in the results.

ROSE Scores and Comparisons

Figure 4 displays ROSE scores for the three years of program implementation. One way to analyze ROSE scores is to evaluate how a school performed in relation to the predicted gain for that school.

FIGURE 4
ROSE SCORES BY TEST AREA, ETDS, 1990-93

	ANDREWS			GALINDO			LANGFORD			PATTON		
	90-91	91-92	92-93	90-91	91-92	92-93	90-91	91-92	92-93	90-91	91-92	92-93
Grade 2												
Reading	0	0	0	0	0	0	0	0	-	0	+	-
Mathematics	0	0	0	0	0	+	+	+	-	0	0	-
Language	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Grade 3												
Reading	+	0	0	0	0	0	+	0	0	0	0	0
Mathematics	+	0	0	0	0	+	0	0	0	-	0	+
Language	n/a	n/a	n/a	n/a	n/a	n/a	n\a	n\a	n/a	n/a	n/a	n/a
Grade 4												
Reading	0	0	0	0	0	0	0	0	0	0	0	0
Mathematics	-	-	0	0	0	+	-	0	0	0	+	+
Language	-	-	0	0	-	0	-	0	0	-	0	+
Grade 5												
Reading	0	+	0	0	+	0	0	+	0	0	-	0
Mathematics	0	0	0	0	+	0	0	0	0	0	0	0
Language	0	0	0	0	0	0	0	0	-	0	0	-

NOTE: The District switched to NAPT from ITBS in 1991-92 for grades 3-5. The NAPT does not measure work-study skills, so these scores from previous years have been dropped from this report.

KEY

0 Achieved Predicted Gain	- Below Predicted Gain
+ Exceeded Predicted Gain	n/a Test not Given

Each school received 10 scores--two each in grades 2 and 3 and three each in grades 4 and 5. The breakdown of the scores is provided in Figure 5. Andrews equalled predicted gains on all 10 scores, Galindo exceeded predicted gains on three scores and equalled predicted gains on seven scores, Langford was below predicted gains for three scores and equalled predicted gains on seven scores, and Patton exceeded predicted gains on three scores, was below predicted gains on three scores, and equalled predicted gains on four scores.

FIGURE 5
COMPARISON OF ROSE SCORES, ETDS, 1992-93

	ANDREWS	GALINDO	LANGFORD	PATTON
Exceed Predicted	0 (0%)	3 (30%)	0 (0%)	3 (30%)
Below Predicted	0 (0%)	0 (0%)	3 (30%)	3 (30%)
Equal Predicted	10 (100%)	7 (70%)	7 (70%)	4 (40%)

1991-92 and 1992-93 ROSE Comparison

Another way to look at the ROSE scores is to compare this year's scores with last year's scores. This comparison indicates movement among the three possible categories (for example: groups that moved from below predicted gain to equal predicted gain). This group improved its score but did not exceed the predicted gain. A comparison of the two scores credits this improvement and shows progress toward achieving the level of exceeding predicted gain.

Out of 10 comparisons at the Apple school (Galindo), from 1991-92 and 1992-93:
- 4 were up (40.0%),
- 2 were down (20.0%), and
- 4 were same (40.0%).

Out of 30 comparisons at the IBM schools (Andrews, Langford, Patton), from 1991-92 and 1992-93:
- 5 were up (16.7%),
- 8 were down (26.7%), and
- 17 were same (56.7%).

No change occurred in most of the comparisons: 40% of Galindo comparisons remained constant, and 57% of the IBM school comparisons remained constant. Galindo registered a higher percentage of change (60%) than the IBM schools (43%).

There were more changes this year than last year at both groups of schools. At Galindo, the number of positive changes doubled from two in 1991-92 to four in 1992-93; however, the number of negative changes also doubled to two in the same time frame. At the IBM schools, the number of positive changes decreased from seven to five, while the number of negative changes increased from five to eight. Overall, this comparison does not reveal an unqualified pattern of improvement.

Three-Year ROPE Scores and Comparisons

ROPE, by looking only at students who have been influenced by the technology program for consecutive years, may be a better indicator of program effect than ROSE. To create the three-year ROPE score, a report for students who have recorded ROSE scores at the same elementary schools for three consecutive years, from 1990-91 to 1992-93, was generated. Under this condition, only groups of students in grades 4 and 5 in 1992-93 were large enough to meet the statistical requirement of having a minimum of 25 students to be included in this study. Figure 6 displays ROPE results.

The ROPE scores are mixed on the impact of computers on student achievement. Although 63% of the scores achieved the predicted gain, 25% were below the predicted gain, and 13% exceeded the predicted gain. These percentages are down from 1991-92 when 84% of the scores achieved the predicted gain, 4% were below the predicted gain, and 12% exceeded the predicted gain.

FIGURE 6
THREE-YEAR ROSE SCORES, 1992-93

	Andrews*	Galindo	Langford*	Patton
Grade 4				
Reading	0	0	-	0
Mathematics	+	0	-	+
Language	0	0	-	+
Grade 5				
Reading	0	0	0	0
Mathematics	0	0	-	0
Language	0	0	-	-

* In grade 4, at Andrews, only 22 students took reading and 24 took the language test for three consecutive years. In grade 5, at Langford, only 24 students took the reading and mathematics tests for three years. Because these numbers are below the minimum of 25, these results should be interpreted with more caution.

KEY

0 Achieved Predicted Gain - Below Predicted Gain
+ Exceeded Predicted Gain

Correlation Between Computer Time and Student Achievement

To test the hypothesis that an increase in logged computer time led to achievement improvement, regression and correlation analyses with ROSE residuals as the dependent variable and logged computer time in a particular subject as the independent variable were performed. This analysis was run for each subject at each school. The analysis should tell if any statistical relationship exists between the two variables. The expectation is that a positive relationship exists; that the higher a student's time on the computer in a given subject, the better the student scores in relation to the predicted gain.

The analysis showed no statistically significant relationship between the two variables. The failure of this analysis to confirm the expectations does not prove the expectations are invalid. Other factors, such as the uncertainty surrounding the logged computer times, and the small sample may have negatively influenced the analysis.

In sum, the ROPE/ROSE comparisons are mixed regarding the effect of technology on student achievement at the four campuses.

TAAS SCORES

The Texas Assessment of Academic Skills (TAAS) is a criterion-referenced test (CRT) which is designed to measure a well-defined set of skills and to reference students' scores to a mastery criterion for that set of skills. The skills are a subset of the Essential Elements adopted by the State Board of Education. TAAS was given to grade 3 students during fall 1992 and to grade 4 students in spring 1993.

Grade 3 TAAS Scores

Grade 3 students took the TAAS in October of each year. Since the test was given so early in the year, when students had been in their current grade level for only eight weeks, TAAS reflects the student achievement for the previous year more than the current year. Therefore, the fall 1992 grade 3 TAAS scores may be considered as a measure of two years of program implementation.

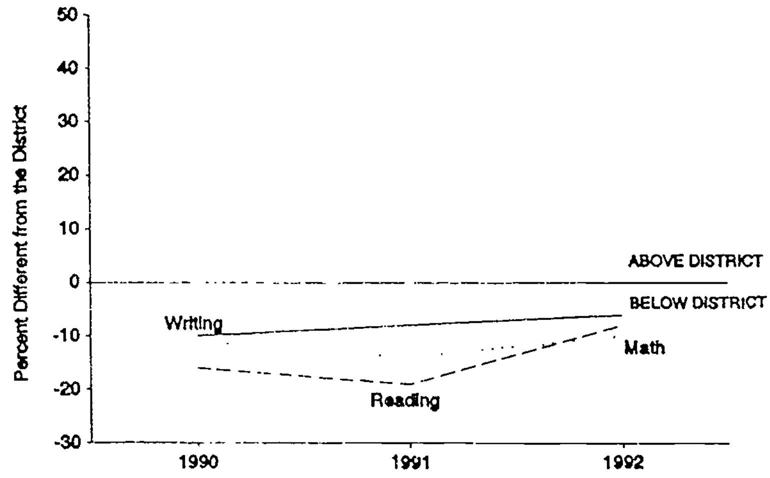
Figure 7 presents TAAS mastery scores for 1990-91 through 1992-93. Scores should be compared with caution, as there are student factors beyond the schools' control, different students took the test each of the three years, and problems have existed with scoring the writing section.

The three IBM schools increased the number of students passing all TAAS tests, while Galindo decreased the number of students passing all tests. Andrews, Galindo, and Langford were below the District average and Patton was above the District average for the number of students passing all TAAS tests. See Figures 8-11 for school difference from the District.

FIGURE 7
TAAS PERCENT MASTERY, GRADE 3, ETDS, 1990-92

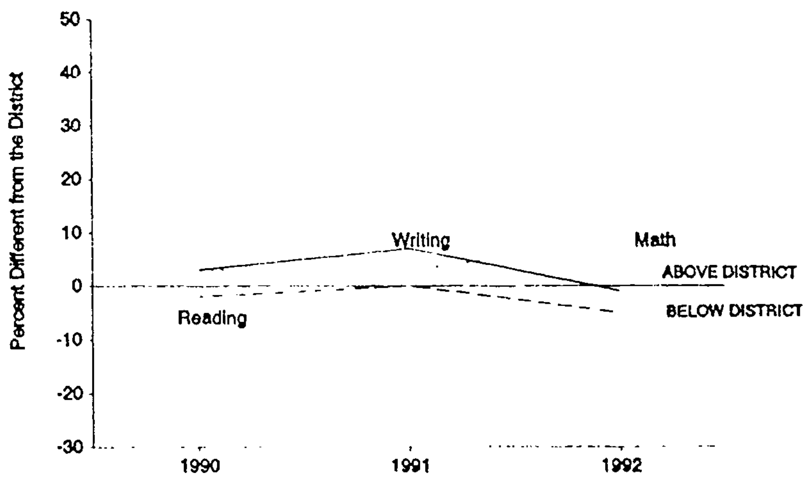
	Andrews	Galindo	Langford	Patton	AISD
Writing					
1990	54	67	62	75	64
1991	53	68	35	86	61
1992	61	66	62	92	67
Reading					
1990	64	78	73	93	80
1991	62	81	81	93	81
1992	69	72	77	94	77
Mathematics					
1990	71	85	70	93	82
1991	73	90	89	97	87
1992	72	90	88	96	82

FIGURE 8
DIFFERENCE FROM DISTRICT, PERCENT OF STUDENTS MASTERING TAAS MINIMUM REQUIREMENTS, ANDREWS, GRADE 3, 1990-92



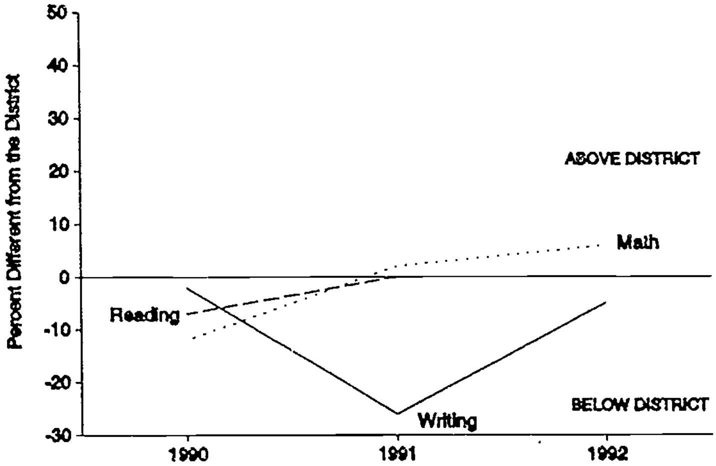
Andrews did not exceed the District average in any test area in 1990, 1991, and 1992.

FIGURE 9
DIFFERENCE FROM DISTRICT, PERCENT OF STUDENTS MASTERING TAAS MINIMUM REQUIREMENTS, GALINDO, GRADE 3, 1990-92



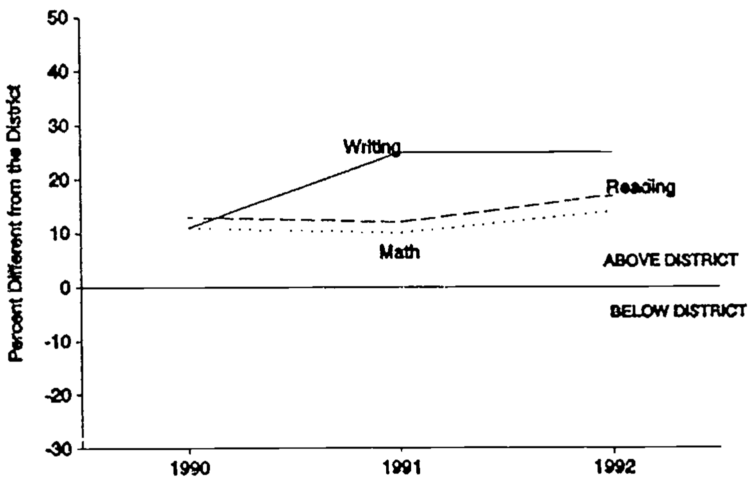
Galindo exceeded the District average in two test areas in 1990, two test areas in 1991 (equalled in one test area), and one test area in 1992.

FIGURE 10
DIFFERENCE FROM DISTRICT, PERCENT OF STUDENTS MASTERING TAAS MINIMUM REQUIREMENTS, LANGFORD, GRADE 3, 1990-92



Langford did not exceed the District average in any test area in 1990, exceeded in one test area in 1991 (equalled in one test area), and exceeded in one test area in 1992 (equalled in one test area).

FIGURE 11
DIFFERENCE FROM DISTRICT, PERCENT OF STUDENTS MASTERING TAAS MINIMUM REQUIREMENTS, PATTON, GRADE 3, 1990-92



Patton exceeded the District average in three test areas in 1990, 1991, and 1992.

In summary, Andrews is below the District average for all three test areas; however, during the last three years it has moved progressively closer to the District average in all test areas. During the last three years Galindo has moved from above the District average in writing to below the District average. In reading, Galindo students have moved from below the District average to equal the District average in 1991 to below the District average again in 1992. In mathematics, Galindo has remained above the District average. Langford has progressed from below the District average in reading and mathematics to equal the District average and above the District average, respectively. In writing, Langford remains below the District average. Patton remains above the District average in all test areas.

Academic Excellence Indicator System (AEIS)

AEIS produces two different reports concerning the academic progress of a school district. Of concern here is the second report, where each campus is compared to the 100 campuses in Texas that are most "similar" to that campus. Each campus is compared to the average performance of the comparison group. Figure 12 displays scores and changes from the four campuses.

FIGURE 12
AEIS, DIFFERENCE FROM GROUP OF 100 CAMPUSES,
PERCENT OF STUDENTS MASTERING TAAS MINIMUM REQUIREMENTS, 1991-93

	1991-92	1992-93	Change
Andrews			
All Tests	-1.3	+8.4	+9.7
Reading	-11.6	-0.3	+11.3
Writing	-0.2	5.6	+5.8
Mathematics	-7.5	-5.6	+1.9
Galindo			
All Tests	+19.2	+5.9	-13.3
Reading	+7.4	0.0	-7.4
Writing	+13.9	+6.1	-7.8
Mathematics	+12.0	+10.4	-1.6
Langford			
All Tests	-17.0	+5.7	+22.7
Reading	+6.1	+3.7	-2.4
Writing	-19.6	-0.9	+18.7
Mathematics	+6.7	+5.9	-0.8
Patton			
All Tests	+9.5	+7.5	-2.0
Reading	+0.3	+1.9	+1.6
Writing	+7.0	+7.9	+0.9
Mathematics	+1.4	+1.1	-0.3

For percent of students mastering the TAAS minimum requirements, from 1991-92 to 1992-93, all ETDS were above their group average. Andrews and Langford increased student achievement when compared with their groups' averages. Galindo and Patton lost ground when compared with their

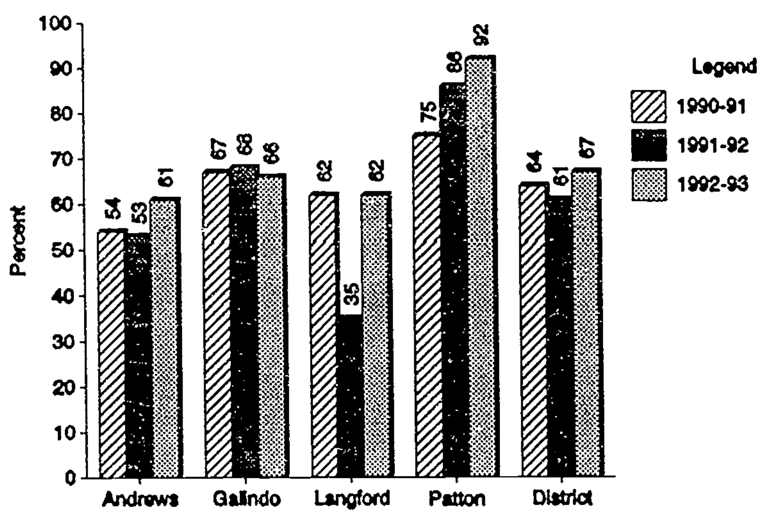
groups; however, they remained above the group average. For example, Andrews went from 1.3 percentage points below its group in 1991-92, to 8.4 percentage points above its group in 1992-93, for a net gain of 9.7 percentage points.

Writing Analysis

The 1992-93 TAAS results suggest improvement in writing achievement for grade 3 students at Andrews, Langford, and Patton. These improvements may be a positive sign for the ETDS and the Writing to Read™ and Writing to Write™ software. These grade 3 students are the first group of students using classroom technology for two years. Figure 13 shows the growth of percent passing the TAAS writing section.

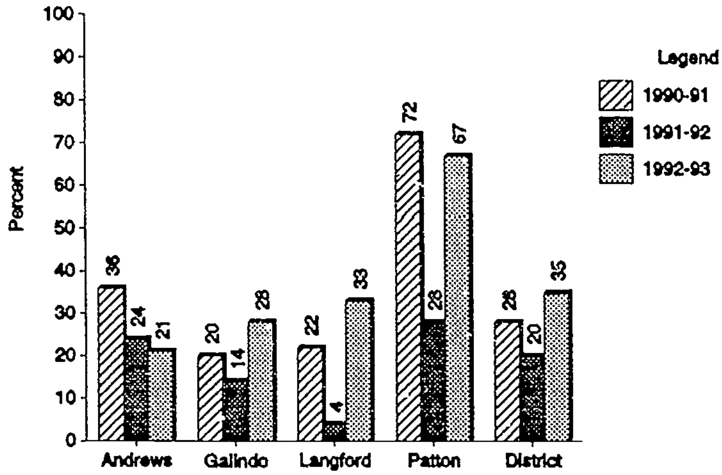
When compared with the District average, Andrews' writing scores have steadily moved toward, but remain slightly below, the District average. Galindo's scores decreased to below the District average, while Langford's scores recovered from a significant decrease in 1991-92 to slightly below the District average in 1992-93. The growth in Patton's scores equalled the growth of the District average.

FIGURE 13
TAAS WRITING PERCENT MASTERY, GRADE 3,
ETDS, 1990-92



A closer look at the TAAS writing section from 1990-91 through 1992-93 suggests other writing improvement. Figure 14 shows that from 1990-91 through 1992-93, Galindo and Langford increased the percentage of students scoring 3 or 4 on TAAS writing. A score of 4 is the highest score attainable on the TAAS writing test, and it shows mastery of all writing components. Galindo's scores increased from 20% of students receiving a 3 or 4 score to 28%, while Langford rose from 22% to 33%. Both campuses were above the 7 percentage point increase in District growth. Andrews' percentage of students scoring a 3 or a 4 decreased from 36% to 21%, while Patton decreased from 72% to 67%.

FIGURE 14
PERCENT OF STUDENTS SCORING 3 AND 4 ON TAAS WRITING, GRADE 3, ETDS, 1990-92



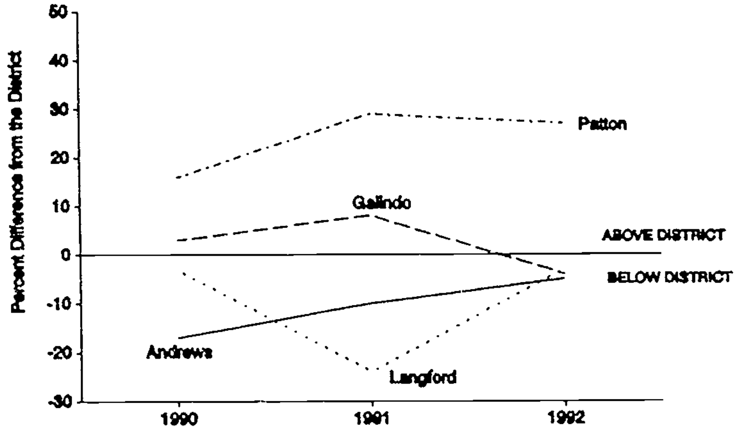
Ethnic and Economic Analysis

In 1992-93, Andrews, Galindo, and Langford were below the District average of students mastering the minimum TAAS requirements (see Figure 16). However, this comparison was not necessarily equitable as the ethnic makeup of the District and these schools varies greatly. An analysis was conducted which examined the number of minority and economically disadvantaged students mastering the minimum TAAS requirements at Andrews, Galindo, Langford, and Patton. If a school had fewer than 10% of a certain ethnic or economic group who took TAAS, those students were not included in the analysis. Figure 15 shows the percent of students taking the TAAS test at each school from 1990 to 1992.

FIGURE 15
PERCENT OF GRADE 3 STUDENTS TAKING TAAS, ETDS, 1990-92

	Andrews			Galindo			Langford			Patton			District		
	1990	1991	1992	1990	1991	1992	1990	1991	1992	1990	1991	1992	1990	1991	1992
African American	73%	64%	59%	3%	7%	4%	20%	15%	14%	2%	4%	4%	19%	17%	19%
Hispanic	16%	24%	33%	56%	67%	76%	38%	49%	45%	13%	11%	12%	31%	33%	32%
White	7%	9%	8%	39%	20%	21%	42%	33%	38%	82%	82%	82%	47%	47%	47%
Economically Disadvantaged	58%	38%	49%	66%	27%	69%	68%	44%	65%	4%	9%	1%	44%	39%	42%
All Students (N)	84	80	75	94	70	118	65	75	65	166	148	156	4779	4812	4946

FIGURE 16
DIFFERENCE FROM DISTRICT, PERCENT OF STUDENTS MASTERING TAAS MINIMUM REQUIREMENTS FOR ALL TEST AREAS, GRADE 3, 1990-92



Comparing the African American, Hispanic, and economically disadvantaged students at Andrews with other African American, Hispanic, White, and economically disadvantaged students districtwide, the Andrews students showed improvement during the last three years, and were well above the District average for 1992. Comparing Galindo's Hispanic and economically disadvantaged students with Hispanic and economically disadvantaged students districtwide, Galindo students showed a decrease in meeting the minimum TAAS requirements, but they were still above the District average. See Figures 17-20.

Comparing the African American, Hispanic, and economically disadvantaged students at Langford with African American, Hispanic, and economically disadvantaged students districtwide, Langford students showed improvement to above the District average. Patton was closer in ethnic makeup to the District than the above three schools. Comparing Hispanic students at Patton with the District average for Hispanic students, Patton was well above the District. White students at Patton were also above the District for White students mastering the minimum TAAS requirements; however, that percentage decreased from 1991 to 1992. See Figures 17-20.

African American and economically disadvantaged students at Andrews and Langford; Hispanic students at Andrews, Galindo, Langford, and Patton; and White students at Patton were performing at higher levels on TAAS than other African American, Hispanic, and economically disadvantaged students districtwide. Andrews showed steady improvement in students mastering minimum TAAS requirements. At Galindo the percent of students mastering TAAS minimum requirements had decreased during the last two years. In 1992, Langford increased the percentage of students mastering minimum requirements to 1990 levels. Patton showed a slight decrease during the last two years in students mastering the minimum requirements, but remained well above the District average.

FIGURE 17
DIFFERENCE FROM DISTRICT, PERCENT OF AFRICAN AMERICAN STUDENTS MASTERING TAAS MINIMUM REQUIREMENTS FOR ALL TEST AREAS, GRADE 3, 1990-92

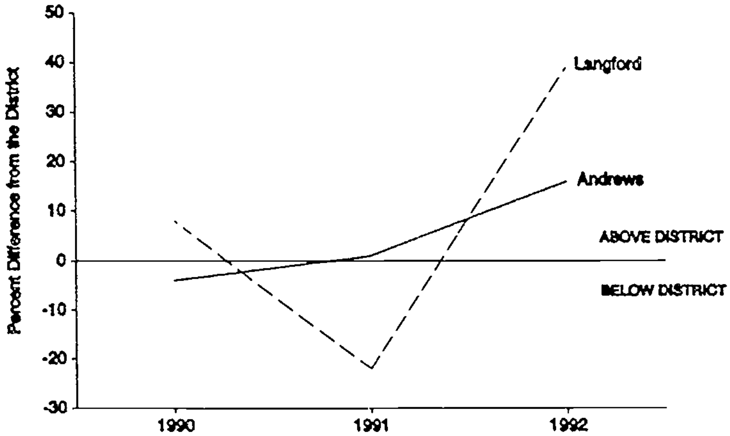
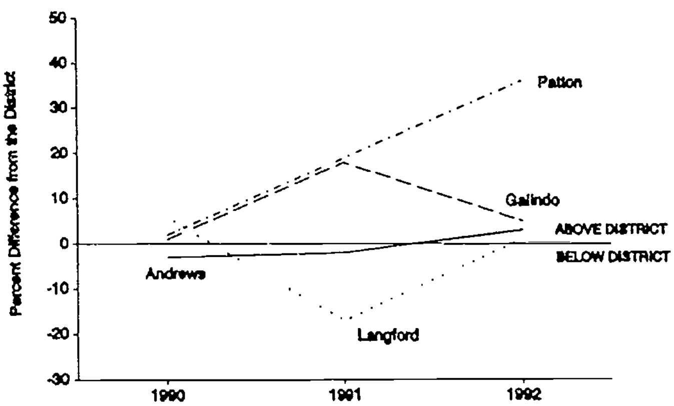


FIGURE 18
DIFFERENCE FROM DISTRICT, PERCENT OF HISPANIC STUDENTS MASTERING TAAS MINIMUM REQUIREMENTS FOR ALL TEST AREAS, GRADE 3, 1990-92



If a school had fewer than 10% of a certain ethnic or economic group who took TAAS, those students were not included in the analysis.

FIGURE 19
DIFFERENCE FROM DISTRICT, PERCENT OF ECONOMICALLY DISADVANTAGED STUDENTS MASTERING TAAS MINIMUM REQUIREMENTS FOR ALL TEST AREAS, GRADE 3, 1990-92

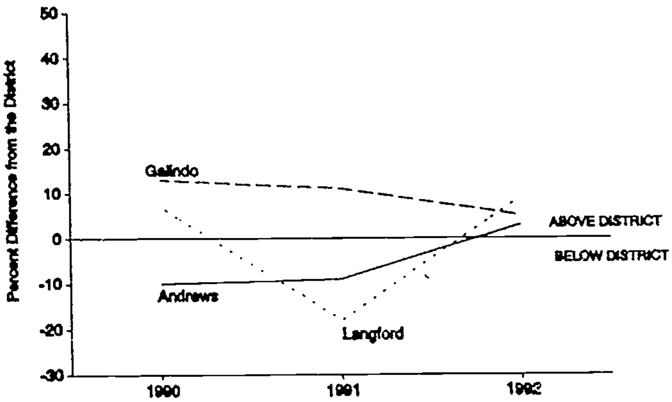
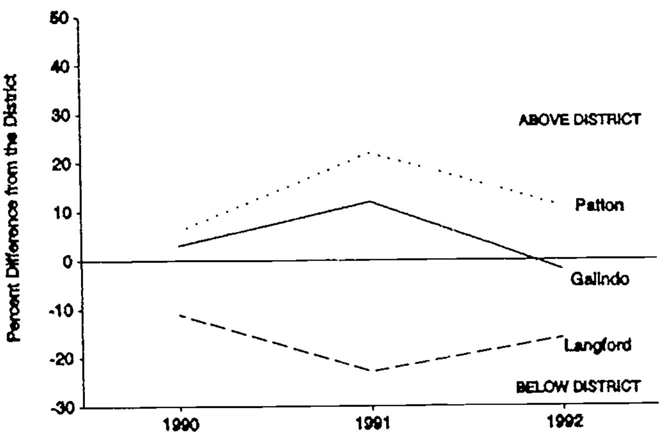


FIGURE 20
DIFFERENCE FROM DISTRICT, PERCENT OF WHITE STUDENTS MASTERING TAAS MINIMUM REQUIREMENTS FOR ALL TEST AREAS, GRADE 3, 1990-92



If a school had fewer than 10% of a certain ethnic or economic group who took TAAS, those students were not included in the analysis.

Grade 4 TAAS Scores

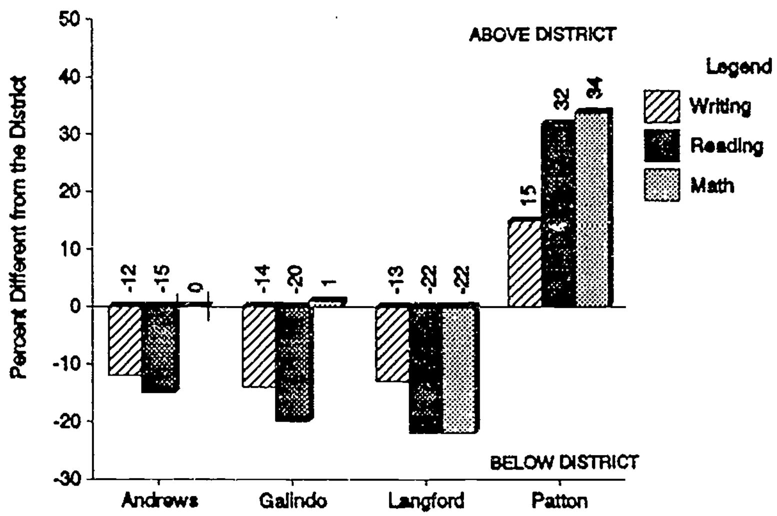
AISD grade 4 students took the TAAS in spring 1993. Since the grade 4 test was given later in the year than the grade 3 TAAS, the grade 4 scores may more accurately reflect three years of program implementation. However, since 1993 was the first year of grade 4 testing, there are no comparison years. As the grade 4 TAAS cannot legitimately be compared with any other test or any other group of students, grade 4 TAAS scores can only be analyzed against the District average.

On the grade 4 TAAS writing section, Andrews, Galindo, and Langford were below the District average for percent mastery, while Patton was above the District average. In reading, Andrews, Galindo, and Langford were below the District average for percent mastery, while Patton was above the District average. For mathematics, Langford was below the District average for percent mastery, Andrews was equal to the District average, and Galindo and Patton were above the District average for percent mastery. See Figure 21 for TAAS percent mastery scores and Figure 22 for schools' difference from the District by test area.

FIGURE 21
TAAS PERCENT MASTERY, ETDS AND DISTRICT, GRADE 4, 1993

	Andrews	Galindo	Langford	Patton	District
Writing	71	69	70	98	83
Reading	42	37	35	89	57
Mathematics	60	61	38	94	60

FIGURE 22
DIFFERENCE FROM DISTRICT, TAAS RESULTS BY TEST AREA, ETDS
GRADE 4, 1993



Ethnic and Economic Analysis

Compared with the District, Andrews, Galindo, and Langford are below the District average for grade 4 students mastering the minimum TAAS requirements (see Figure 23). However, as mentioned above, this comparison may be misleading as the ethnic makeup of these three schools varies from the District. This analysis looked at the number of grade 4 minority and economically disadvantaged students mastering the minimum TAAS requirements at the four campuses. If a school had fewer than 10% of an ethnic or economic group who took TAAS, those students were not included in the analysis (see Figure 24).

FIGURE 23
DIFFERENCE FROM DISTRICT, PERCENT OF STUDENTS MASTERING TAAS MINIMUM REQUIREMENTS FOR ALL TEST AREAS, ETDS, GRADE 4, 1993

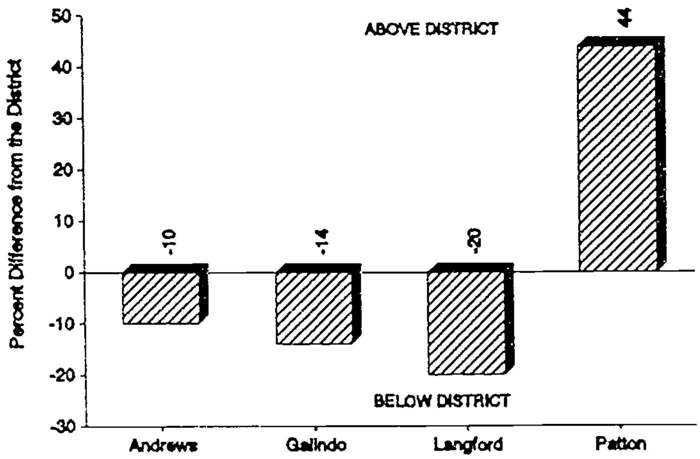


FIGURE 24
PERCENT OF GRADE 4 STUDENTS TAKING TAAS, ETDS, 1993

	Andrews	Galindo	Langford	Patton	District
African American	51%	8%	18%	5%	17%
Hispanic	31%	70%	58%	11%	35%
White	16%	22%	20%	84%	45%
Economically Disadvantaged	62%	77%	60%	7%	46%
All students (N)	61	83	85	142	4871

Grade 4 African American students at Andrews are performing on par with African American students districtwide in mastering TAAS minimum requirements, while more Andrews' Hispanic and

economically disadvantaged students are mastering minimum TAAS requirements than other Hispanic and economically disadvantaged students districtwide (see Figures 25-28).

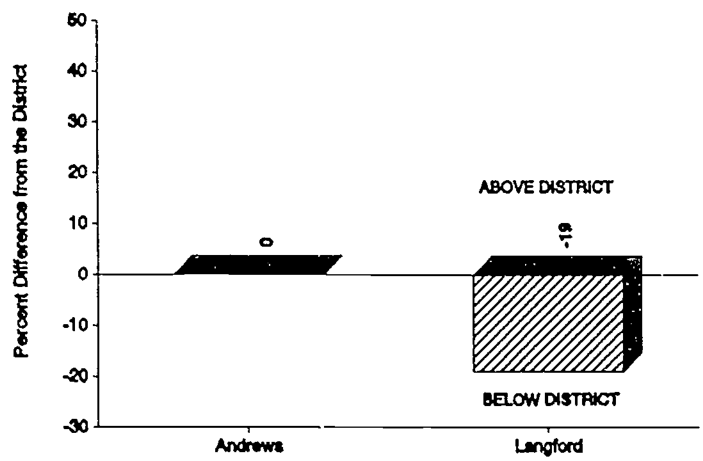
Galindo's grade 4 Hispanic, White, and economically disadvantaged students are performing below the District average for Hispanic, White, and economically disadvantaged students mastering the minimum TAAS requirements. See Figures 25-28.

African American, Hispanic, and White students at Langford are performing below the District average for African American, Hispanic, and White students mastering the minimum TAAS requirements. Langford's economically disadvantaged students are performing above the District average for economically disadvantaged students. See Figures 25-28.

Hispanic and White students at Patton are performing well above the District average for Hispanic and White students mastering the TAAS minimum requirements. See Figures 25-28.

In conclusion, grade 4 TAAS scores show that Andrews' African American students are performing equally with and economically disadvantaged students are performing better than African American and economically disadvantaged students across the District. Langford's economically disadvantaged students are performing better than other economically disadvantaged students across the District. Patton's Hispanic and White students are performing well above other Hispanic and White students districtwide.

FIGURE 25
DIFFERENCE FROM DISTRICT, PERCENT OF AFRICAN AMERICAN STUDENTS MASTERING TAAS MINIMUM REQUIREMENTS FOR ALL TEST AREAS, ETDS, GRADE 4, 1993



If a school had fewer than 10% of a certain ethnic or economic group who took TAAS, those students were not included in the analysis.

FIGURE 26
DIFFERENCE FROM DISTRICT, PERCENT OF HISPANIC STUDENTS MASTERING TAAS MINIMUM REQUIREMENTS FOR ALL TEST AREAS, ETDS, GRADE 4, 1993

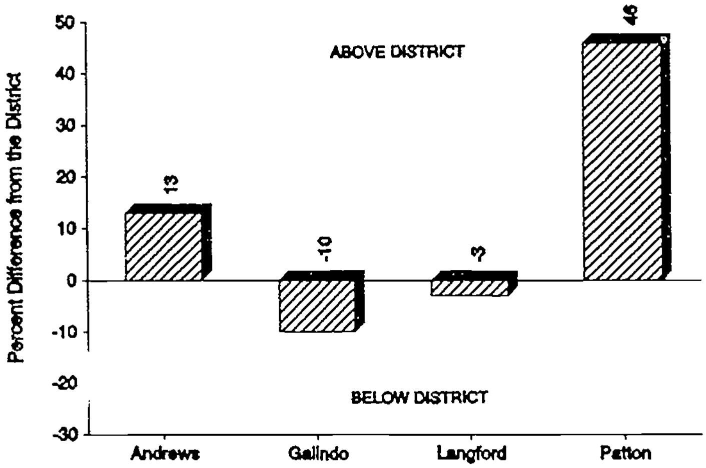
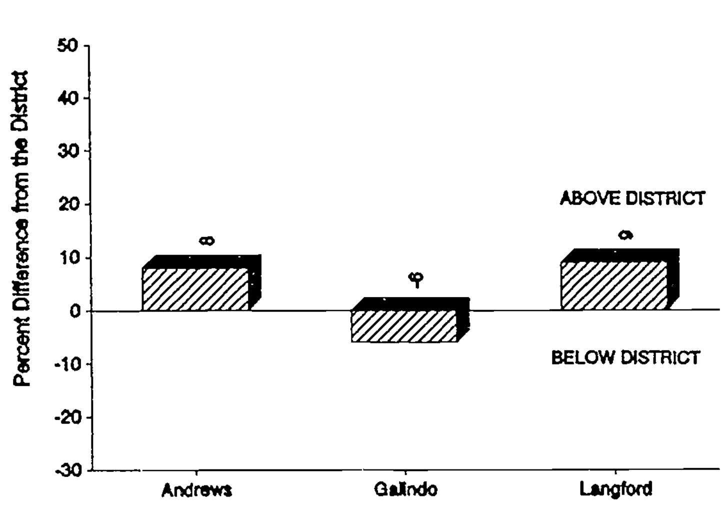
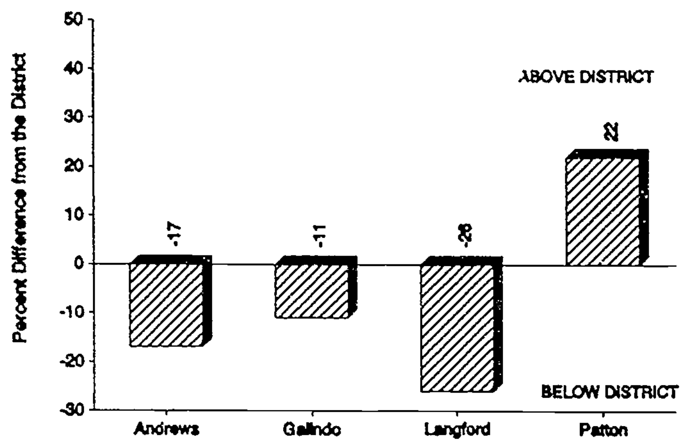


FIGURE 27
DIFFERENCE FROM DISTRICT, PERCENT OF ECONOMICALLY DISADVANTAGED STUDENTS MASTERING TAAS MINIMUM REQUIREMENTS FOR ALL TEST AREAS, ETDS, GRADE 4, 1993



If a school had fewer than 10% of a certain ethnic or economic group who took TAAS, those students were not included in the analysis.

FIGURE 28
DIFFERENCE FROM DISTRICT, PERCENT OF WHITE STUDENTS MASTERING TAAS MINIMUM REQUIREMENTS FOR ALL TEST AREAS, ETDS, GRADE 4, 1993



SUMMER SCHOOL

This section of the report considers two aspects of the 1992 summer school program:

1) What types of students were selected to participate in the summer school program?
2) Did the summer school students' test scores improve the subsequent year?

Student Selection

One of the strategies at the ETDS to keep students functioning successfully at or beyond grade level is to offer summer school classes to students not on grade level. Thus, student selection for summer school is a major concern.

Ideally, 100% of the summer school students would be classified at-risk. Figure 29 displays the percent of summer school students classified at-risk by campus. The figure displays at-risk percentages for 1991-92 and 1992-93. The at-risk statistics are generated in October of each year, so by the time summer school student selection decisions are made in the spring, a student's actual at-risk status may have changed. Thus, the figure displays pre- and postsummer school at-risk statistics in an effort to portray the status of the students more accurately.

At no campus were 100% of the summer school students classified at-risk. The postsummer school at-risk statistics were higher than the presummer school statistics, reflecting the change in at-risk status during the year. The percent of summer school students classified at-risk ranged from a low of 71% at Galindo to 93% at Langford.

Another way to evaluate summer school selection is to compare the percent of summer school students classified at-risk with the percent of school-year students classified at-risk. Reflecting the reason for summer school, to offer classes to students not on grade level, the summer school at-risk percentage should be higher than the school-year percentage.

The percent of summer school students classified at-risk was higher at all four campuses than the percent of school-year students classified at-risk. At Langford the summer school percent was more than twice as high as the 1992-93 school-year percent, and at Patton the summer percent was over three times as high. *Therefore, while 100% of the summer school students were not at-risk at any school, the percent at-risk in summer school was higher than the percent at-risk in the 1992-93 school year at all schools.*

FIGURE 29
AT-RISK PERCENT COMPARISON
1992 SUMMER SCHOOL STUDENTS AND 1991 AND 1992 SCHOOL-YEAR STUDENTS

	Year	Andrews	Galindo	Langford	Patton
1992 Summer School Students	1991-92	53.3	57.5	81.0	47.5
	1992-93	74.6	71.0	93.3	75.0
1991 School Year Students	1991-92	50.7	38.2	41.6	21.6
1992 School Year Students	1992-93	52.3	41.6	44.1	20.7

Test Scores of Summer School Students

The best way to analyze summer school students' test scores is to use the ROPE methodology described on page 13. However, ROPE requires a minimum of 25 students for the results to acquire sufficient statistical confidence. The summer school student groups studied at the ETDS ranged from a low of 9 to a high of 17. Nonetheless, the trends in the summer school ROPE data are so clear and consistent that they warrant review (see Figure 30).

No group of summer school students in any grade at any school exceeded the predicted gain. Out of the 38 scores for all four campuses, 19 scores (50%) were below the predicted gain. At Galindo, three scores (30%) were below the predicted gain and seven scores (70%) equalled predicted gains. At the three IBM campuses, 16 scores (57%) were below the predicted gain and 12 scores (43%) equalled predicted gains.

Again, these scores are not as statistically certain as would be preferred. However, the predicted gains are based on analyses of students with similar characteristics districtwide who had no concentrated technology program and did not have the benefit of summer school. **The pattern of no groups exceeding the predicted gain and 50% being below the predicted gain indicates a need to examine the purpose or activities of the summer school program.**

FIGURE 30
1992 SUMMER SCHOOL STUDENTS, ROPE SCORES BY TEST AREA, ETDS

	ANDREWS	GALINDO	LANGFORD	PATTON
Grade 2				
Reading	-	-	n/a	-
Mathematics	-	0	n/a	-
Language	n/a	n/a	n/a	n/a
Grade 3				
Reading	0	0	0	-
Mathematics	-	0	-	-
Language	n/a	n/a	n/a	n/a
Grade 4				
Reading	0	0	0	-
Mathematics	0	0	0	0
Language	-	-	-	0
Grade 5				
Reading	0	0	0	0
Mathematics	0	-	-	-
Language	-	0	-	-

NOTE: The District switched to NAPT from ITBS in 1991-92 for grades 3-5. The NAPT does not measure work-study skills, so these scores from previous years have been dropped from this report.

KEY

0 Achieved Predicted Gain	- Below Predicted Gain
+ Exceeded Predicted Gain	n/a Test not Given

PROGRESS TOWARD THE A+ COALITION GOALS

The ETDS program plan spells out four specific goals for the computer technology program. Figure 31 displays the goals and how progress toward their achievement is measured.

FIGURE 31
ETDS THREE-YEAR PROGRAM GOALS

Program Goal	Measure of Effectiveness
In three years, reduce by 50% the number of students who are not in their age-appropriate grade level.	Number of students overage one or more years
In three years, reduce by 50% the number of students who are not achieving on grade level in reading, writing, and mathematics.	1) Number of students below 30th percentile in reading and mathematics on the ITBS/NAPT 2) Number of students failing reading, mathematics, or writing sections of TEAMS/TAAS
Develop a comprehensive teacher training program to ensure effective implementation and classroom use of technology.	1) Employee surveys 2) Teacher interviews
Demonstrate to the community the educational benefits of technology, thereby obtaining support for districtwide implementation.	Degree to which program is fully implemented and its goals are reached

GOAL 1 - REDUCE BY 50% THE NUMBER OF STUDENTS WHO ARE NOT IN THEIR AGE-APPROPRIATE GRADE LEVEL

Attachment 6 contains the number and percent of overage students as of October 30, for each ETDS. This measure counts all students in the school on October 30 of each year without considering if they have been in the school less than the entire time of the program. This method dilutes the measure of program effect by looking at students who have not had time to be affected by the program.

During the three years of program implementation the percent of overage students has decreased. However, the percentage of overage students at the four campuses exceeded the District average by two percentage points, 12% compared to 10%. The number and percentage of overage students has decreased at Andrews (110 to 67, 16% to 11%), Langford (73 to 68, 14% to 11%), and Patton (111 to 104, 11% to 11%). Andrews and Patton had decreases in enrollment from 883 to 616 and from 1,008 to 961, respectively. Langford's enrollment increased from 538 to 594. Galindo increased in the number and percent of overage students from 106 to 109, 13% to 15%. Galindo also had an increased enrollment from 678 to 753.

Sometimes overage students move into and out of schools, thereby changing the school's number of overage students. To control partially for these circumstances, any overage student who entered the school from another school was removed from the analysis; however, overage students who left the school were not removed from the analysis. The analysis showed that from 1991-92 to 1992-93, Andrews and Patton each retained one student, Langford retained four students, and Galindo retained 10 students.

Teachers are also beginning to believe that the introduction of classroom technology can reduce retention rates. During the 1993 ORE Coordinated Survey, 73% of teachers agreed or strongly agreed (up from 68% and 61% in previous years) that technology would decrease retention rates. Only 6% of teachers disagreed or strongly disagreed with this statement. See Attachment 1A for three-year trends.

In conclusion, the number of overage students has decreased, but not by 50% to meet the program goal. The program goal may have been unrealistic. In order to meet the goal of reducing by 50% the number of students who are not in their age-appropriate grade level, no new retainees should be created, and half of the overage students that currently exist need to be promoted two grades (e.g., an eight-year-old student in grade 2 in 1991-92 would need to be promoted to grade 4 in 1992-93). There were no provisions in the ETDS plan to advance students. Without other specialized accelerated programs, that goal may not be attainable. However, the schools are moving in the right direction by decreasing the number of overage students they are creating each year and accelerating several students. From 1990-91 to 1991-92, one student at Patton was accelerated, and from 1991-92 to 1992-93, four students were accelerated two grades (three at Andrews, and one at Langford). Teachers also believe, more now than ever, that the implementation of classroom technology will reduce retention rates.

GOAL 2 - REDUCE BY 50% THE NUMBER OF STUDENTS WHO ARE NOT ACHIEVING ON GRADE LEVEL IN READING, WRITING, AND MATHEMATICS

The ETDS reduced the number of students failing a section of grade 3 TAAS over the three-year program. However, the student failure rates did not decrease the 50% set by the program goal. Two schools did reach the 50% reduction goal in one test subject area. Langford reduced the number of students failing mathematics from 28% to 12%, and Patton decreased the number of students failing writing from 20% to 8% during the three years of program implementation.

Even though the number of students achieving on grade level in reading, writing, and mathematics has not increased by 50%, many teachers believed that the technology has increased students' academic progress. During 1992-93, 91% of teachers at the ETDS believed that technology increased the academic progress of their students. This is a positive shift in attitude, as only 59% of teachers in 1991, and 77% in 1992, believed technology increased academic progress. See Attachment 1A.

GOAL 3 - DEVELOP A COMPREHENSIVE TEACHER TRAINING PROGRAM TO ENSURE EFFECTIVE IMPLEMENTATION AND CLASSROOM USE OF TECHNOLOGY

The District's Instructional Technology Coordinator organized all technology training. Teachers completed the original training in the software delivery system during extensive hands-on training

sessions in the summer of 1990. Additional formal follow-up training was conducted during the 1991-92 school year. Seventeen additional follow-up training sessions were provided on Writing to Read™ and Writing to Write™ during the 1992-93 school year. New ETDS teachers were trained prior to the new school year and received additional training once a month throughout the year.

Informal training was also being provided by teachers, students, and education instruction specialists. On-campus experts were developed to assist teachers when problems arose. Students oftentimes became more familiar with a program than a teacher and would often teach the teacher about time-saving tips or new computer programs. Since November 1992, Andrews received specialized instruction from an Education Instruction Specialist once a week. The Education Instruction Specialist, a former teacher at Patton, paid for by IBM, worked with teachers to integrate technology into classroom activities.

On the 1993 ORE Coordinated Survey, the majority of teachers, 72%, thought that they had received sufficient training to incorporate technology appropriately into their teaching. This percentage is higher than the 66% in 1992, and the 61% in 1991, who thought they had received sufficient training. Only one in 10 teachers said that he or she had not received sufficient training to incorporate technology appropriately into the classroom, a decrease from one in five teachers in 1991. See Attachment 1A for detailed findings.

A vast amount of formal training has been implemented; however, several teachers noted that they thought more training was needed. The teachers would like additional training to include more grade-specific software (i.e., grade 1 teachers need more specific training with grade 1 software).

GOAL 4 - DEMONSTRATE TO THE COMMUNITY THE EDUCATIONAL BENEFITS OF TECHNOLOGY, THEREBY OBTAINING SUPPORT FOR DISTRICTWIDE IMPLEMENTATION

To reach the goal of demonstrating to the community the educational benefits of technology and obtaining support for districtwide implementation, it is necessary to increase parental and community interest and involvement in the schools. Many community members visited the four ETDS during the three years of program implementation. These community members included Congressman Jake Pickle and representatives from his Washington, D.C. office, representatives from the Austin Project (a group of local business and government leaders), and representatives from IBM Corporation. Representatives from school districts across Texas and the nation also visited the ETDS, and information concerning the schools was aired during an interview on National Public Radio.

On the 1993 ORE Coordinated Survey, teachers at the four campuses were asked whether they would recommend technology as it was implemented on their campuses to schools districtwide. Of the 133 teachers who responded, 79% strongly agreed or agreed that they would recommend technology to other schools districtwide. This response was up from 66% and 71% in previous years. See Attachment 1A for three-year trends.

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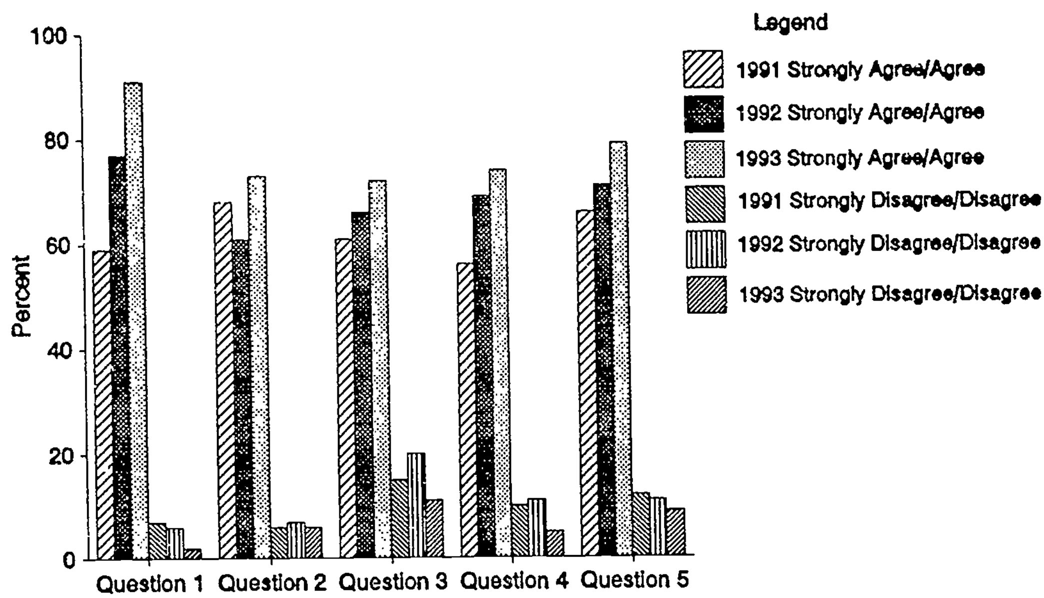
ATTACHMENT 1A
TEACHER SURVEY RESPONSES

The ORE Coordinated Survey was conducted in the spring of 1993. This survey marks the third time ETDS staff has responded to the same set of core questions (numbers 1-5). This year, four additional items were added concerning telephone usage and other technology factors. Of the 159 surveys sent to teachers, 135 completed the survey, a return rate of 85%.

	Valid Responses			Strongly Agree			Agree			Neutral			Disagree			Strongly Disagree		
Question Number	1991	1992	1993	1991	1992	1993	1991	1992	1993	1991	1992	1993	1991	1992	1993	1991	1992	1993
1. The academic progress of students on my campus has been increased because of technology.	189	176	134	30.1	36.5	43.3	28.4	40.1	47.8	34.4	17.4	7.5	4.4	4.2	1.5	2.7	1.8	0.0
2. The implementation of the technology will help reduce retention rates on my campus.	190	179	135	26.2	20.6	30.4	41.5	40.0	43.0	26.2	32.9	20.7	5.5	5.3	4.4	0.5	1.2	1.5
3. I received sufficient training to incorporate technology appropriately into my curriculum.	193	176	130	21.0	27.4	24.6	40.3	38.7	46.9	24.2	14.3	17.7	8.1	13.7	9.2	6.5	6.0	1.5
4. The addition of technology into my classroom has made my teaching more effective.	193	174	133	23.1	31.1	37.6	32.8	37.7	35.3	34.4	20.4	22.6	7.5	7.8	4.5	2.2	3.0	0.0
5. I would recommend technology as it was implemented on my campus.	193	175	133	25.3	33.5	42.1	40.9	37.1	36.8	22.0	18.0	12.0	9.1	8.4	8.3	2.7	3.0	0.8



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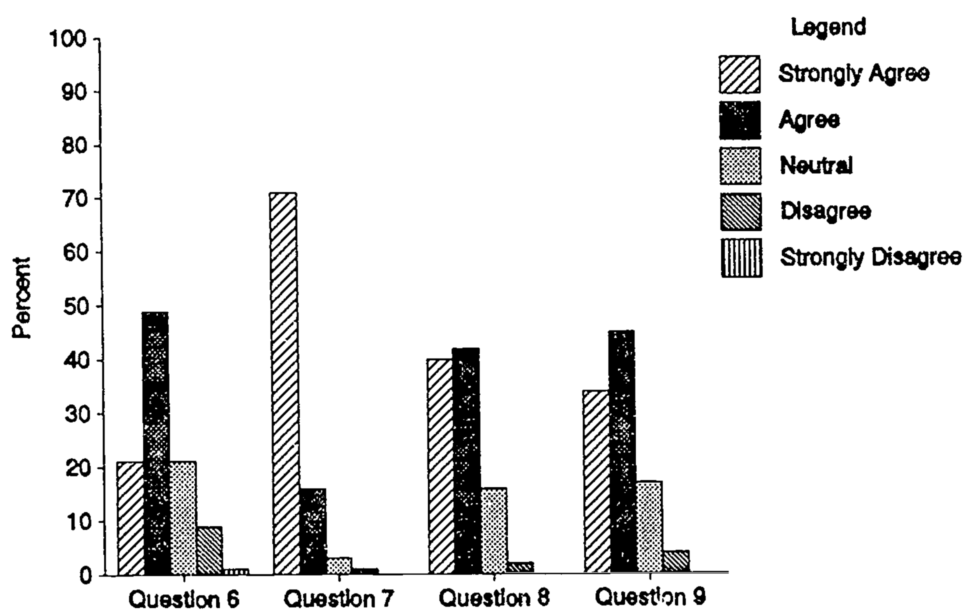
ATTACHMENT 1B
TEACHER SURVEY RESPONSES

There were four new questions added to the 1992-93 ORE Coordinated Survey.

Question Number	Valid Responses	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
6. Technology in the classroom facilitates effective evaluation of students.	135	20.7	48.9	20.7	8.9	0.7
7. A telephone in my classroom has helped me better communicate with parents.	134	70.9	16.4	3.0	0.7	0.0
8. Technology allows me to provide more individualized instruction.	134	39.6	41.8	16.4	2.2	0.0
9. Computer technology facilitates curriculum integration.	132	34.1	44.7	17.4	3.8	0.0



ATTACHMENT 2
FEEDBACK PROVIDED TO ADMINISTRATORS AND TEACHERS

AUSTIN INDEPENDENT SCHOOL DISTRICT
Office of Research and Evaluation

KEY FINDINGS

✓ The sixth six weeks data reflected that the logging systems at all three campuses were operational for 25 days. Logs were collected before the last week of school to allow teachers and lab technicians time to clear the servers.

✓ The average minutes per day per student ranged from 14.31 at Andrews to 9.17 at Patton. Langford's average minutes per day per student was 11.06.

✓ Patterns of computer usage vary from teacher to teacher, grade to grade, subject to subject, and campus to campus.

Definitions of Terms

Normal school day: All time recorded between the hours of 7:45 a.m. through 2:45 p.m. will be defined as normal school day.

Nonschool day: All time recorded before 7:45 a.m. and after 2:45 p.m. will be defined as nonschool day.

Minutes per student per day: The dividend (total of minutes for the six weeks) divided by the divisor (number of students in the analysis) provides the quotient (number of minutes per student per six weeks). The quotient, divided by the number of days in the six weeks, minus any days the logging system is not operational, gives the average minutes per student per day.

ATTACHMENT 2 (cont.)

AUSTIN INDEPENDENT SCHOOL DISTRICT
Office of Research and Evaluation

Key Information Chart
Part A--Time on Computer Analysis, Andrews Elementary
Sixth Six Weeks, 1992-93

Average Minutes Per Day Per Student on Computer at Andrews Elementary

Grade	Sixth Six Weeks
K	10.89
1	18.67
2	14.46
3	9.69
4	14.79
5	19.00
All	14.31

Subject Students Spent Most and Least Time at Andrews

In Grade:	Excluding tools, students spent the most time on:	Excluding tools, of the subjects that the grade used, students spent the least time on:
	6th Six Weeks	**6th Six Weeks**
K	Reading	Typing
1	Typing	Language
2	Math	Language
3	Typing	Reading
4	Typing	Reading
5	Typing	Reading
All	Typing	Language

Software With Highest Average at Andrews

	Software	Minutes Per Day Per Student
Sixth Six Weeks	Writing & Publishing Center	1556.92

ATTACHMENT 2 (cont.)

Key Information Chart

Part B - Time on Computer Analysis, IBM Elementary Technology Demonstration Schools
Average Minutes Per Day Per Student on Computer
Sixth Six Weeks, 1992-93

Andrews Elementary

Grade	Sixth Six Weeks
K	10.89
1	18.67
2	14.46
3	9.69
4	14.79
5	19.00
All	14.31

Langford Elementary

Grade	Sixth Six Weeks
K	9.84
1	19.82
2	10.73
3	13.50
4	8.50
5	4.57
All	11.06

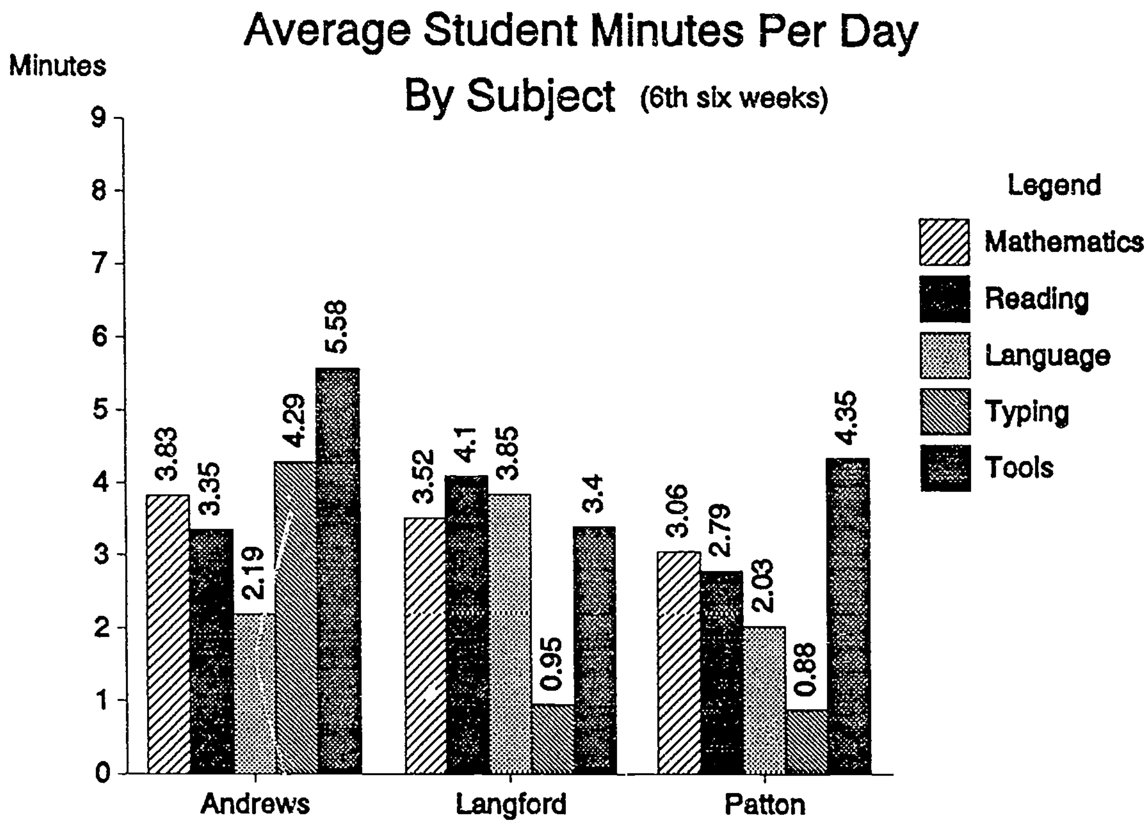
Patton Elementary

Grade	Sixth Six Weeks
K	14.68
1	8.07
2	11.66
3	8.80
4	7.32
5	2.74
All	9.17

Nonschool Day
Time on Computer Analysis, IBM Elementary Technology Demonstration Schools
Sixth Six Weeks, 1992-93

	Total Minutes	Number of Students	Avg. Minutes Per Six Weeks	Avg. No. of Minutes Per Day Per Student
6th Six Weeks				
Andrews	399	104	3.84	.15
Langford	105	40	2.65	.11
Patton	841	472	1.78	.07

ATTACHMENT 2 (cont.)



Average number of minutes per day, per student, by subject for all grades.

ATTACHMENT 2 (cont.)

AUSTIN INDEPENDENT SCHOOL DISTRICT
OFFICE OF RESEARCH AND EVALUATION
A+ EVALUATION
PROGRAM NAME: APLTEACH
ANDREWS - 5TH SIX WEEKS
GROUP 1 : COMPUTER USAGE FROM 3/1/93 TO 4/9/93

	A	B	C	D	E
TOTAL	10689	19	563	25	22.50
MATH	2225	19	117	25	4.68
READING	3	1	3	25	0.12
LANGUAGE	5506	11	501	25	20.02
TYPING	741	8	93	25	3.71
TOOL	2214	14	158	25	6.33
PRIM ED	0	0	0	25	0

A = TOTAL MINUTES FOR THE SIX WEEKS

B = NUMBER OF STUDENTS IN ANALYSIS

C = MINUTES PER STUDENT FOR THE SIX WEEKS

D = NUMBER OF DAYS IN THE ANALYSIS

E = AVERAGE MINUTES PER DAY, PER STUDENT

ATTACHMENT 3A
SOFTWARE PROGRAMS

The core software listed below was networked at Andrews, Langford, and Patton.

Mathematics
- Algebra
- Comparison Kitchen
- Math Concepts
- Math Practice
- Math Number Sense
- Math Rabbit
- Math with Manipulatives
- Measurement, Time, and Money
- Number Farm
- SF Math Fractions
- SF Math Geometry
- SF Math Graphing and Probability
- SF Math Money and Time
- SF Math Primary Geometry

Tools
- DisplayWrite Assistant
- Express Publisher
- LANSchool
- LinkWay
- Mi Editor Primario
- Microsoft Works
- Primary Editor Plus
- The Writing and Publishing Center

Language
- Alphabet Circus
- Bouncy Bee Learns Letters
- Bouncy Bee Learns Words
- Combining Sentences
- Parts of Speech
- Punctuation
- Reading for Meaning
- Reading for Information
- SESOS: Dinosaurs
- Spelling
- Stories and More
- The Playroom
- Vocabulary
- Voy A Leer Escribiendo
- Writing to Read
- Writing to Write

Typing
- Touch Typing for Beginners

ATTACHMENT 3B
SOFTWARE PROGRAMS

The IBM schools have introduced noncore software programs to the curriculum. Many of the software programs were networked; however, a few were used on stand-alone computers. Below is a list of additional software added by the IBM schools.

Language
- Bert's Dinosaurs
- Boggle Spelling Game
- Dinosaur Picture Data Base
- El Circo
- Hangman Game
- Jeopardy for Children
- KID PIX
- Mazes: Make Your Own Maze
- Mickey's ABC's
- Preschool Pack
- Preschool Sounds Like
- Reader Rabbit for 1st Grade
- Stickey Bear Reading
- StoryBook Weaver
- Talking ABC's
- Texttris Word Game
- The Circus
- Tree House
- Ultimate Geography
- USA States, Geography, Capitals
- Word Gallery 3.0
- Word Game of Initial Sounds and More
- Wordsearch with Topics
- Zentris

Mathematics
- Berenstein Bears Counting
- Checkers
- El Horno Magico
- Lugnut Math Game
- Math Hunt Game
- Math Rescue: Word Problems
- New Math Blasters Plus
- The Magic Oven
- The Piñatas
- 3-D Chess

ATTACHMENT 3C
SOFTWARE PROGRAMS

Below is a list of software programs available at Galindo Elementary.

Language
- Balloon Trip
- Bank Street Writer 1.03
- Build an Airplane
- Clown Maker
- First-Letter Fun
- Fun from A to Z
- GROUPwriter
- Kid Pix
- Phonics Prime Time
- Picture Chompers
- Puppet Show
- Space Station Freedom
- Spelling Puzzles & Tests
- Spelling Workout
- Stone Soup
- Sound Ideas
- Talking Text Writer
- The Magic Painter
- The Malt Shop
- Those Amazing Reading Machines
- Touch 'N Write
- Type to Learn
- Word Herd
- Word Wizard
- Words at Work

Tools
- Kids Time
- Super Print

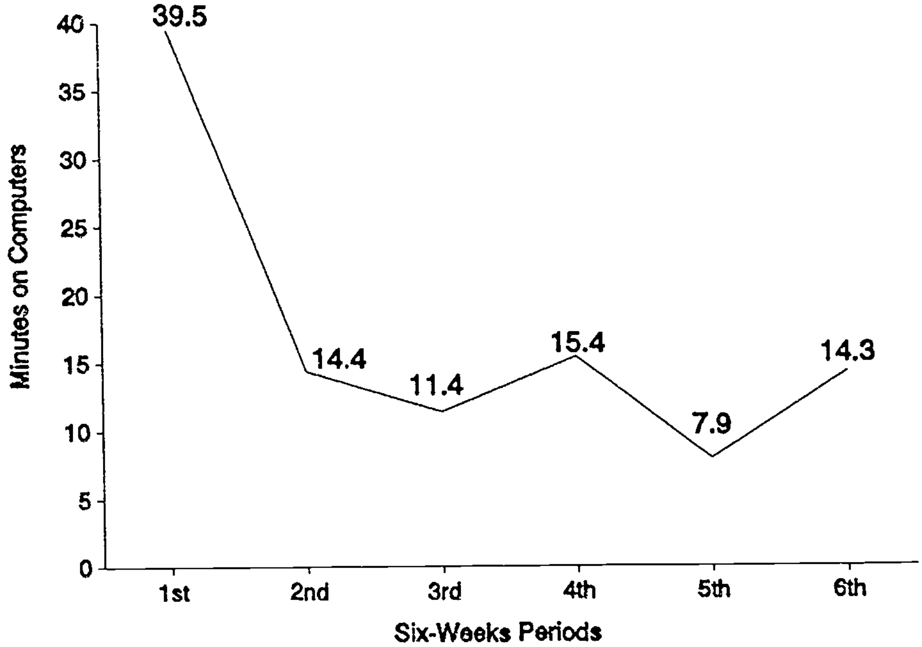
Mathematics
- Circus Math
- Clock Works
- Conquering Decimals
- Conquering Fractions
- Conquering Whole Numbers
- Countering Critters
- Decimal Concepts
- Fractions Concepts
- Fraction Practice
- Fraction Munchers
- Number Munchers
- Measurements
- Money Works
- Problem Solving
- Race Time
- Space Subtraction
- Speedway & Spanish Math
- Subtraction Puzzles

Science
- Invisible Bugs
- Lunar Greenhouse
- Murphy's Minerals
- Mystery Objects
- Mystery Matters
- Sun & Seasons
- Weeds & Trees
- Wood Car Rally

Social Studies
- Jenny's Journey
- The Market Place
- The Oregon Trail
- The Navigator Leaps Back

ATTACHMENT 4A
AVERAGE MINUTES PER DAY ON COMPUTER

ANDREWS ELEMENTARY



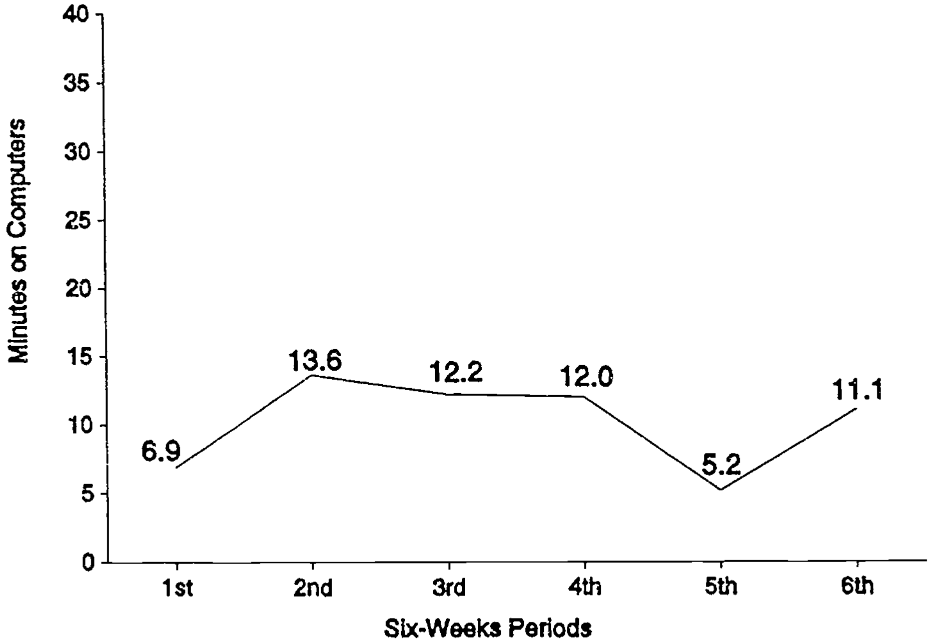
Six-Weeks Periods
For All Grades

Grade	1st six weeks*	2nd six weeks	3rd six weeks	4th six weeks	5th six weeks	6th six weeks
K	17.0	3.8	5.5	10.8	5.4	10.9
1	60.0	27.6	13.3	27.9	10.9	18.7
2	26.4	15.2	12.7	13.0	3.9	14.5
3	34.4	14.9	7.2	14.0	6.8	9.7
4	64.3	17.9	15.3	12.7	8.2	14.8
5	38.7	14.7	16.7	14.6	13.0	19.0
All	39.5	14.4	11.4	15.4	7.9	14.3

* Logging systems were operational for only four days.

ATTACHMENT 4B
AVERAGE MINUTES PER DAY ON COMPUTER

LANGFORD ELEMENTARY



Six-Weeks Periods
For All Grades

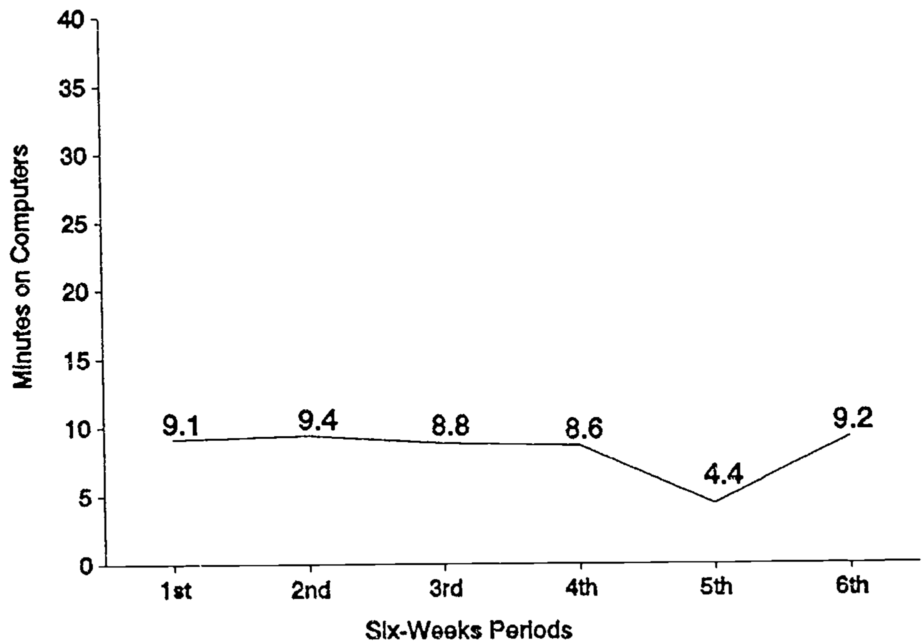
Grade	1st six weeks*	2nd six weeks	3rd six weeks**	4th six weeks	5th six weeks**	6th six weeks
K	2.2	.9	2.0	11.7	5.0	9.8
1	15.0	28.8	21.0	13.0	8.5	19.8
2	4.5	12.0	35.5	16.8	2.9	10.7
3	5.2	12.7	11.1	7.6	5.5	13.5
4	4.6	8.8	12.1	10.1	3.8	8.5
5	5.2	9.0	NA	13.6	2.8	4.6
All	6.9	13.6	12.2	12.0	5.2	11.1

* Logging systems were operational for only eighteen days.

** Teachers were removed from the analysis because of incomplete downloads, damaged disks, and downed servers.

ATTACHMENT 4C
AVERAGE MINUTES PER DAY ON COMPUTER

PATTON ELEMENTARY



Six-Weeks Periods
For All Grades

Grade	1st six weeks*	2nd six weeks	3rd six weeks**	4th six weeks	5th six weeks**	6th six weeks
K	4.7	8.9	9.2	13.0	6.5	14.7
1	8.7	13.3	13.7	14.9	7.2	8.1
2	7.1	13.6	NA	7.4	3.0	11.7
3	15.1	6.8	8.8	6.5	3.9	8.8
4	12.8	6.4	NA	5.5	3.2	7.3
5	6.9	7.3	4.8	4.8	2.1	2.7
All	9.1	9.4	8.8	8.6	4.4	9.2

* Logging systems were operational for only thirteen days.

** Teachers were removed from the analysis because of incomplete downloads, damaged disks, and downed servers.

ATTACHMENT 5
NAPT/ITBS SCORES 1991-92 and 1992-93

	Composite				Mathematics				Reading				Language			
	All	H	AA	O	All	H	AA	O	All	H	AA	O	All	H	AA	O
ANDREWS																
Grade 1																
1991-92	64	51	64	87	63	65	60	84	52	46	51	74	60	46	62	69
1992-93	50	36	53	65	46	38	48	54	46	33	50	56	55	37	62	66
Grade 2																
1991-92	54	46	53	78	47	47	43	76	46	38	46	67	61	48	63	77
1992-93	50	62	42	84	44	60	33	84	45	55	38	66	64	67	60	85
Grade 3																
1991-92	32	32	29	60	38	42	31	66	32	30	30	54	51	45	51	74
1992-93	42	40	38	78	45	49	39	82	41	35	39	78	49	48	47	72
Grade 4																
1991-92	28	27	25	65	34	36	29	65	26	24	24	59	41	38	42	56
1992-93	43	43	35	67	49	50	42	83	37	36	31	71	54	59	48	76
Grade 5																
1991-92	36	21	32	71	40	23	36	75	34	21	31	61	44	30	42	71
1992-93	34	37	31	45	35	40	30	53	37	39	36	41	45	46	44	49
GALINDO																
Grade 1																
1991-92	65	61	41	76	69	67	65	73	53	52	31	62	72	69	62	81
1992-93	81	78	54	87	74	73	45	79	66	60	53	76	84	84	68	86
Grade 2																
1991-92	64	62	61	73	61	58	51	73	56	52	49	68	72	71	73	75
1992-93	76	70	55	86	74	70	57	81	65	63	39	74	75	69	66	85
Grade 3																
1991-92	48	40	54	68	58	51	60	73	42	35	49	64	60	58	76	62
1992-93	48	45	33	72	59	56	44	81	41	38	26	63	55	56	51	58
Grade 4																
1991-92	43	30	67	62	50	40	63	63	39	23	68	62	42	30	53	61
1992-93	56	49	53	76	63	57	51	80	49	41	49	71	52	46	70	62
Grade 5																
1991-92	53	50	--	59	59	54	--	70	47	46	--	46	55	52	--	60
1992-93	41	35	46	56	43	37	53	56	41	35	41	57	46	42	55	54

Underlined numbers signify that fewer than 10 students were tested.

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ATTACHMENT 5 (cont.)

	Composite				Mathematics				Reading				Language			
	All	H	AA	O	All	H	AA	O	All	H	AA	O	All	H	AA	O
LANGFORD																
Grade 1																
1991-92	43	36	32	56	35	33	23	41	40	32	36	50	57	53	52	63
1992-93	50	42	58	66	50	44	41	67	48	43	52	57	64	57	77	70
Grade 2																
1991-92	40	29	38	47	39	33	30	45	43	28	44	53	44	31	51	49
1992-93	66	38	27	59	36	38	21	47	40	38	24	54	49	48	43	56
Grade 3																
1991-92	43	43	33	46	46	45	44	48	40	43	26	45	52	54	39	52
1992-93	37	27	28	51	41	29	31	58	37	30	30	46	37	29	31	48
Grade 4																
1991-92	43	50	13	61	46	49	19	64	42	53	12	55	50	56	36	53
1992-93	45	42	40	55	44	41	40	53	46	44	39	55	46	45	44	50
Grade 5																
1991-92	46	35	39	63	45	37	35	61	46	36	44	61	44	39	39	54
1992-93	41	42	19	63	37	38	16	60	45	47	26	64	39	41	20	54
PATTON																
Grade 1																
1991-92	81	62	71	82	75	55	69	76	72	69	57	73	78	67	72	78
1992-93	87	86	92	87	79	72	66	81	76	68	82	77	85	86	95	84
Grade 2																
1991-92	83	79	78	84	79	72	63	80	82	75	69	83	78	84	91	77
1992-93	84	85	--	84	78	74	55	79	80	81	64	80	83	89	95	81
Grade 3																
1991-92	78	73	56	80	79	75	64	80	75	70	50	77	88	83	73	89
1992-93	82	77	46	83	85	82	47	86	75	70	40	77	78	81	68	77
Grade 4																
1991-92	81	75	70	82	81	73	72	82	78	69	67	79	86	86	84	86
1992-93	86	85	52	88	87	81	46	89	81	79	59	83	85	76	70	87
Grade 5																
1991-92	70	42	61	73	73	52	60	75	65	39	62	68	75	63	65	77
1992-93	78	67	53	80	77	69	54	79	75	62	50	77	75	68	53	76

Underlined numbers signify that fewer than 10 students were tested

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ATTACHMENT 6
NUMBER AND PERCENT OF OVERAGE STUDENTS AT THE ETDS, 1990 - 1992
AS OF OCTOBER 30

Andrews Elementary

	October 30, 1990			October 30, 1991			October 30, 1992		
Grade	Enrollment	# Overage	% Overage	Enrollment	# Overage	% Overage	Enrollment	# Overage	% Overage
K	110	5	4.5	136	0	0.0	107	1	.9
1	113	8	7.1	124	9	7.3	93	9	9.7
2	105	15	14.3	126	15	11.9	97	7	7.2
3	108	23	21.3	111	24	21.6	97	13	13.4
4	111	34	30.6	111	31	27.9	77	16	20.8
5	92	25	27.2	125	37	39.6	76	20	26.3
Total	709	110	15.5	833	116	13.9	616	67	10.9

Galindo Elementary

	October 30, 1990			October 30, 1991			October 30, 1992		
Grade	Enrollment	# Overage	% Overage	Enrollment	# Overage	% Overage	Enrollment	# Overage	% Overage
K	125	1	0.8	120	0	0.0	130	0	0.0
1	128	18	14.1	119	5	4.2	137	12	8.8
2	99	16	16.2	122	18	14.8	123	13	10.6
3	113	31	27.4	90	22	24.4	125	27	21.6
4	79	20	25.3	93	24	25.8	98	24	24.5
5	85	20	23.5	86	21	24.4	98	33	33.7
Total	678	106	15.6	702	90	12.8	753	109	14.5

Langford Elementary

	October 30, 1990			October 30, 1991			October 30, 1992		
Grade	Enrollment	# Overage	% Overage	Enrollment	# Overage	% Overage	Enrollment	# Overage	% Overage
K	79	2	2.5	74	5	6.8	95	4	4.2
1	78	11	14.1	92	8	8.7	81	7	8.6
2	85	11	12.9	82	14	17.1	90	8	8.9
3	79	15	19.0	83	13	15.7	84	13	15.5
4	72	20	27.8	81	16	19.8	106	19	17.9
5	57	14	14.6	67	17	25.4	82	17	20.7
Total	510	73	14.3	538	73	13.6	594	68	11.4

Patton Elementary

	October 30, 1990			October 30, 1991			October 30, 1992		
Grade	Enrollment	# Overage	% Overage	Enrollment	# Overage	% Overage	Enrollment	# Overage	% Overage
K	151	7	4.6	153	5	3.3	162	8	4.9
1	190	25	13.2	188	22	11.7	140	4	2.9
2	164	21	12.8	185	24	13.0	175	22	12.6
3	159	27	17.0	163	24	14.7	169	21	12.4
4	160	10	6.3	161	25	15.5	159	25	15.7
5	181	21	11.6	158	12	7.6	156	24	15.4
Total	1005	111	11.0	1008	112	11.1	961	104	10.8

ATTACHMENT 7
NUMBER AND PERCENT OF AT-RISK STUDENTS AT ETDS, 1990 - 1992
AS OF OCTOBER 30

Andrews Elementary

	October 30, 1990			October 30, 1991			October 30, 1992		
Grade	Enrollment	# At-Risk	% At-Risk	Enrollment	# At-Risk	% At-Risk	Enrollment	# At-Risk	% At-Risk
K	128	33	25.8	142	41	28.9	107	33	30.8
1	120	69	57.5	140	51	36.4	93	39	41.9
2	118	42	35.6	134	69	51.5	97	52	53.6
3	118	48	40.7	113	72	63.7	97	57	58.8
4	113	63	55.8	112	78	69.6	77	52	67.5
5	95	60	63.2	128	94	73.4	76	58	76.3
Total	764	332	43.5	869	441	50.7	616	322	52.3

Galindo Elementary

	October 30, 1990			October 30, 1991			October 30, 1992		
Grade	Enrollment	# At-Risk	% At-Risk	Enrollment	# At-Risk	% At-Risk	Enrollment	# At-Risk	% At-Risk
K	126	15	11.9	120	23	18.7	130	21	16.2
1	135	81	60.0	119	18	14.4	137	42	30.7
2	102	26	25.5	122	65	48.9	123	53	43.1
3	120	50	41.7	90	50	52.1	125	61	48.8
4	87	41	47.1	93	61	60.4	98	65	66.3
5	94	42	44.7	86	53	56.4	98	61	62.2
Total	714	269	37.7	702	284	38.2	753	313	41.6

Langford Elementary

	October 30, 1990			October 30, 1991			October 30, 1992		
Grade	Enrollment	# At-Risk	% At-Risk	Enrollment	# At-Risk	% At-Risk	Enrollment	# At-Risk	% At-Risk
K	89	9	10.1	85	15	17.6	95	13	13.7
1	79	39	49.4	96	17	17.7	81	18	22.2
2	90	21	23.3	85	42	49.4	90	52	57.8
3	85	27	31.8	88	55	62.5	84	49	58.3
4	78	33	42.8	84	48	57.7	106	70	66.0
5	65	32	49.2	74	44	59.5	82	48	58.5
Total	546	175	32.1	572	238	41.6	594	262	44.1

Patton Elementary

	October 30, 1990			October 30, 1991			October 30, 1992		
Grade	Enrollment	# At-Risk	% At-Risk	Enrollment	# At-Risk	% At-Risk	Enrollment	# At-Risk	% At-Risk
K	152	9	5.9	153	6	3.9	162	9	5.6
1	194	69	35.6	190	29	15.3	140	5	3.6
2	168	28	16.7	190	49	25.8	175	52	29.7
3	167	36	21.6	168	45	26.8	169	33	19.5
4	162	20	12.3	172	58	33.7	159	46	28.9
5	184	38	20.7	161	36	22.4	156	54	34.6
Total	1027	200	19.5	1034	223	21.6	961	199	20.7

ATTACHMENT 8
LESSONS LEARNED BY PROGRAM STAFF DURING THREE YEARS OF IMPLEMENTATION

During the three years of program implementation, the four campuses have gained valuable experience and have learned many lessons on how to implement classroom technology and restructure classrooms successfully. **The four ETDS principals and other involved staff developed the lessons learned listed below.**

The lessons learned are organized into five areas: technical, training, program implementation, educational strategies, and program evaluation. These lessons learned are presented in the form of recommendations that schools and school districts considering classroom technology implementation should incorporate into their planning process.

Technical

Understand the technical implications and complexities of the program. It is important that everyone involved in the program understand the technical implications and complexities of a program of this scope. The three IBM schools lost a full year of technology implementation because computer installation took one year to complete.

Technology (e.g., networks and hardware) must be available at all times. Broken equipment must be fixed quickly. Teachers must know that if they have the use of technology written into their lesson plans, the technology will be available.

Carefully select a technology vendor. Buy computers that are capable of being upgraded and supported.

Training

Training is the key for helping teachers through the implementation process effectively. The training must be focused, hands on, and combine a common vision with hardware/software/curriculum integration. Establish computer training for new teachers, and provide follow-up coaching to established teachers to enhance success.

Time the training to coincide with computer delivery. If possible, training should be delayed until the equipment is installed and operable at the campus. Training for teachers at the IBM schools began in July 1990, and training for the Apple school began in September. Training was scheduled at this early date because the training required may hours, and the hardware was scheduled to be completely installed by October. However, the student computers were not fully installed until April 1991. The lag between the training and complete hardware installation diminished the value of the training.

Program Implementation

Allow schools time and resources to develop a vision and an implementation plan. Schools need the opportunity to develop their own vision and implementation plan. Time and plans for vision development and the planning process were included in the original plan but were not utilized.

Systemic change takes longer than expected. The systemic change of implementing technology into the classroom and restructuring the classroom takes longer than one or two years to accomplish.

ATTACHMENT 8 (cont.)

Assure teachers of the program's future. Some teachers are reluctant to "buy into" change because they think it will only exist for a few years and then disappear, like so many other educational programs. Assuring them of the program's future is very important to increase program success.

Educational Strategies

Integrate the computer in curriculum. The technology alone does not bring about improvements in student learning and achievement. To accomplish these goals, the technology must be effectively incorporated into instructional delivery. At the three IBM schools, the Teaching and Learning with Computers (TLC) delivery system is employed. This paradigm shift, away from the direct teaching method towards a centers-based learning approach, requires a dedicated staff, strong leadership from the principal, considerable time and effort, staff development, and a willingness to change.

Carefully consider additional software purchases. Additional software purchases should be carefully considered, in context with the educational benefit of the currently available software. Teachers should also be included in the software selection.

Program Evaluation

Define reasonable goals based on what the schools are realistically able and allowed to do. The goals of the ETDS were more far reaching than the time schedule or instructional structures put in place to accomplish them. To meet the goals schools would have had to advance students a grade level, and there was no provision in the plan to do that.

Record a "before and after" portfolio at the school. Recording a before and after portfolio at the school level would capture the differences in the learning environment and the experiences of students and teachers during the three years of technology implementation.

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